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UNIVERSITY OF TORONTO



REPORT OF THE DEAN  
OF THE  
FACULTY OF MEDICINE

SESSION 1940-1941

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# UNIVERSITY OF TORONTO

## FACULTY OF MEDICINE

*Toronto, June 30, 1941*

*To the Graduates in Medicine of  
the University of Toronto.*

*The Annual Report of the Dean of the Faculty of  
Medicine for the Session 1940-41 is herewith forwarded to  
you, with all good wishes and with the hope that you will  
find in it information that will sustain your interest in the  
School.*

W. E. GALLIE, M.D.,  
Dean.

## THE ANNUAL REPORT OF THE DEAN OF THE FACULTY OF MEDICINE

As the third year of the war approaches, it seems appropriate that we should review the contribution that the Faculty is making towards the national effort that is necessary for victory. This contribution has consisted, up to the present, in supplying specially trained medical personnel to the three branches of the armed forces, and in conducting whatever researches have been suggested or requested by the Medical Services or the National Research Council. Now it is proposed to add to these a rearrangement of the curriculum so that the graduation of our students may be speeded up and the supply of doctors increased.

Reference is made in the departmental reports to the individual members of the staff who have enlisted. A total of 54 have gone, and when one considers this number in relation to the size of the staff it is very creditable that it has been possible to carry through the curriculum with so little disturbance. It is a fair statement to make that up to the present the courses have been conducted as thoroughly as in peace-time and that the graduates of the past two years have had as good a training as their predecessors. This is in marked contrast to what obtained at this stage of the last war when the whole Faculty was in a state of disorganization.

A review of the activities of the departments cannot fail to impress one with the great quantity and the variety of the research being conducted. It will be observed, however, that when compared with other years, there has been a good deal of curtailment of general research and replacement of it by research on pure war problems and by routine activities which are part of the war effort. Thus in the Banting and Best Department of Medical Research most of the work has been aimed at the solution of problems of the Air Force. Under the leadership of Professor H. C. Bazett who has been lent by the University of Pennsylvania to the Department for the duration of the war, a group of fifteen research workers have devoted their whole time to these problems. The results have been important, but being war secrets cannot be recorded here.

In the Department of Physiology the chief activity has been the development of the Canadian project for the preparation of dried human serum. This has now reached very large proportions consisting of the regular collection of blood from thousands of donors, the reduction of the blood to the form of a dry powder, and the shipment of it in suitable containers to the army. The difficulties that have been met in the schemes for supplying armies with sufficient blood substitutes to meet the necessities of large casualty lists have led to a search for substitutes for blood, and the studies of Professor N. B. Taylor and Dr. E. T. Waters with solutions of isinglass give promise.

Studies on the control of infection by the new sulphonamide drugs continue to hold the attention of all the clinical and several of the scientific departments. The details of these will be found in the individual reports. Among them may be mentioned specially the work in Bacteriology by Dr. Phillip Greey and that of the Departments of Medicine, Paediatrics, and Surgery.

What seems to be an important contribution to the general knowledge of infection of wounds is that of Dr. Ronald Hare of the Department of Hygiene and Preventive Medicine, whose studies indicate that the streptococcal infections which were the cause of so much disaster in the last war did not occur at the time of the wounding but were introduced later from air which had been contaminated from infected throats or from the infected wounds of other patients. He recommends great intensification in measures to prevent the unnecessary infection of wounds.

As usual, the research laboratories of the Hospital for Sick Children continue to produce good work. An important contribution this year from the Depart-



ment of Paediatrics, is the demonstration that the prothrombin content of the infant's blood at birth can be much increased by administration of an adequate amount of vitamin K in the diet of the expectant mother. It is hoped that this will eliminate haemorrhagic disease in the newborn. This laboratory continues to co-operate with the Ontario Agricultural College and with the Dominion Departments of Agriculture and National Health in the study of the vitamin content of Canadian diets.

A review of the departmental reports will show the marked tendency of both the clinical and the scientific departments to collaborate with one another in important researches. Thus the combined studies of the Departments of Physiology and Anatomy and of the Departments of Physiology and Paediatrics and Anatomy are examples. This willingness of one department to take an interest in the problems of another restrains expanding costs of administration and ensures really expert assistance.

The rearrangement of the curriculum which has been adopted by the University to meet war conditions arose from a request from the Director-General of the Medical Services in Ottawa for an increased supply of young graduates for service as medical officers in the armed forces. This request was discussed at a meeting of the deans of the Medical Schools held in Ottawa and it was agreed by resolution:

(a) that the Medical Schools of Canada be requested to speed up the graduation of medical students during the present war emergency;

(b) that the hospitals in Canada be asked to accept eight months' internships in lieu of twelve months;

(c) that it be requested that the provincial regulations be modified to permit the curriculum to be completed in a shorter time than presently required, provided this is done without prejudice to a sound medical training;

(d) that because a considerable proportion of medical students depend for maintenance and tuition on their vacation earnings, the Dominion government be asked to assist in the financing of students and instructional staff where this is necessary;

(e) that in view of the fact that the graduation of medical students is to be speeded up for war purposes, these students should be exempt from military training during their clinical years.

Following the presentation of this resolution to the government and before its adoption by the Faculty, a request came from Ottawa for an estimate of the financial assistance the University would require. While this information was being gathered another message was received to the effect that owing to the nature of the financial estimates submitted by various medical schools the government considered it inadvisable to proceed at present with the proposed arrangement for the early graduation of medical students.

However, as the matter of an adequate supply of medical officers for the armed forces and of doctors for civilian needs is so urgent, and as the Medical School of the University of Toronto supplies almost half of the graduates in Medicine in this country, the University decided to go ahead with the scheme of speeding up the course and to leave the matter of the financial assistance required for solution at a later date.

The plan adopted involves the advancement of the day of opening school from September 23 to August 25 and the extension of the spring term from the usual closing date of May 15 to June 27. That is, an additional ten weeks will be added to each academic year, at the expense of the usual holidays. The University feels that while this may come as a hardship to some students who depend for a portion of their financial support on work done in the long summer vacation, nevertheless the continuance of four and a half months' holidays in war-time is not justifiable and would leave both Faculty and students open to criticism of slackness in the national war effort.



Fortunately it has been possible to make this change without seriously disturbing the curriculum. Under the six-year plan each student spent six times thirty, or one hundred and eighty weeks in school, and this is so also in the new course. The only serious upset is in the internships. At present the students graduate in June and enter hospital for one-year rotation service on July 1. Under the new plan, as graduation day is advanced four months in each year, it becomes necessary to reduce the internship to eight months. However, while this involves a sacrifice on the part of students and hospitals, it is a compromise which both will be willing to accept.

The net result of these changes will be that on May 1 next, one hundred and twenty-five doctors from this School will enter hospitals as interns, thereby making available for the army a corresponding number of last year's graduates, who will have completed their internship. Another hundred and twenty-five will be ready for interning at the end of December, thus releasing the preceding group for the army, and so on every eight months. A student entering as a freshman this year will have graduated and completed his rotating internship in a little over five years instead of seven as in the past.

As a result of these changes in the medical curriculum it has been necessary to discontinue for the duration of the war the honour course in Biological and Medical Sciences. The students in the Arts course have been given the option of transferring to the equivalent year in Medicine or to some other suitable course in Arts, and almost all have chosen the former. It is a sacrifice, of course, for these students to have to give up their course in Honour Science but as practically all aim at ultimate transfer to Medicine, the sacrifice, when the character of the times is considered, is not too great.

A change of major importance was made this year in the examinations for the M.D. degree and for licensure in the Medical Council of Canada. Formerly the examinations for the latter took place a week or so after the University examination and were the cause of much expense and trouble for our students. Through the persistent efforts of our Assistant Dean, Dr. E. S. Ryerson, who for several years has been a member of the Medical Council, an arrangement was made whereby the written portions of the two examinations were taken co-incidentally. This new plan was tried out for the first time last June and seemed satisfactory to all.

The establishment of the new course leading to the degree of Bachelor of Physical and Health Education will be of interest to our graduates. This course is not a responsibility of the Faculty of Medicine but several of the courses, such as Anatomy, Physiology, and Hygiene and Preventive Medicine are given by our departments. The course qualifies the candidates for admission to the College of Education, into which the majority will go, preparatory to accepting appointments as physical directors in the secondary schools. The new course is under the direction of Dr. E. S. Ryerson who has been much interested in its development.

Just before he died, Lord Lothian, British Ambassador to the United States, asked the Rockefeller Foundation whether it would consider the possibility of giving a number of British medical students the opportunity to complete their training in the medical schools of the United States and Canada. While medical students in England are not subject to draft, the air raids have imposed excessive demands upon all medical schools and teaching hospitals. Not a single one of these institutions in London has escaped bombing. The conditions for thorough and adequate teaching in Medicine are therefore severely deranged. A considerable number of the teachers, moreover, have been called to military or special civilian duties, and, together with the profession as a whole, are exposed to injury and death in a measure that heightens the importance of adequate training for those who will be their successors.

Lord Lothian's suggestion was warmly received by the Rockefeller Foundation which at once appropriated \$100,000 to initiate a plan of training British



medical students in America. Twenty-five leading medical schools in Canada and the United States, among them our own, have indicated their cordial willingness to accept these new students and we have been informed that they will be here for the opening of school. Their expenses will be met from the Rockefeller fund for the period of their clinical training and a rotating internship. The Foundation has indicated that if the scheme works well it will be broadened to include larger numbers of students.

In addition to these British medical students we have also seven Norwegians whose medical training we shall complete sufficiently for them to join the Medical Service of the Norwegian Air Force now training in Toronto.

Reference has been made in previous reports to the use of the Moss Aptitude Test as an aid in selecting those students who will be promoted from the first to the second year. In the United States this test is applied before the student is accepted in a medical school but with us, owing to the fact that we accept all applicants who have the senior matriculation, the test is not applied till November of the first year. Exhaustive studies have been made by Miss Mary Salter of the Department of Psychology on the predictive value of this and other tests, and her conclusion is that there is a close relationship between the scores obtained in the Moss test and the grades subsequently obtained in the examinations. She points out that by combining the results of the aptitude test and the matriculation gradings we have a method of predicting the students' performance, both in the preclinical and clinical years, that is so accurate that it might well be used in selecting those students for promotion to the second year who are likely to be successful throughout their course. She points out, however, that the Moss Aptitude Test is somewhat unfair to Canadian medical students as it is based largely on the study of the premedical sciences, a study which the Canadian student does not undertake seriously until he is already in the first year of the medical school. She proposes, therefore, to design a medical aptitude test particularly adapted for Toronto students. It will place more stress on general intelligence and less on technical knowledge and will eliminate those features that seem unfair. The Department of Psychology is much interested in the study and the Head of the Department, Professor Bott, hopes to make a distinct contribution to the problem of selecting the best students.

Many honours have come this year to members of the staff. Dr. G. E. Richards was elected Vice-President of the American Roentgen Ray Society and was awarded the bronze medal of the society for his work on the radiological treatment of cancer of the tongue. Dr. R. R. Graham was elected President of the Interstate Postgraduate Medical Association. Professor C. H. Best has been appointed a Scientific Director of the International Health Division of the Rockefeller Foundation. He has been awarded the Purser Lectureship in Trinity College, Dublin, and the Harvey Lectureship in New York. Dr. J. H. Elliott was elected President of the American Association of the History of Medicine. Dr. Duncan Graham was appointed a member of the National Research Council to fill the vacancy left by the death of Sir Frederick Banting. Dr. Malcolm Cameron was re-elected President of the Council of the College of Physicians and Surgeons of Ontario, and Dr. E. S. Ryerson, President of the Medical Council of Canada. The Dean was elected President of the American College of Surgeons.

The Faculty noticed with pleasure the award of the D.Sc., *honoris causa*, to Dr. A. E. Mackay of Portland, Oregon, by the University of Oregon. Dr. Mackay was a graduate of Toronto in 1887 and has had a distinguished career as a member of the Faculty which has now honoured him.

The Charles Mickle Fellowship for this year was awarded to Dr. James Bertram Collip, B.A.Tor., M.A.Tor., Ph.D.Tor., D.Sc.Alberta, M.D.Alberta, for his contributions in the study of the physiological effects of the pituitary hormones. Dr. Collip, it will be remembered, was associated with Sir Frederick Banting in the researches on insulin. Since those early days he has continued



to make great contributions to medical science. He fills the post of Professor of Biochemistry at McGill with great distinction.

\*The Donald C. Balfour Lecture for 1941 was delivered by David Cheever, A.B., M.D. Harvard, F.A.C.S., Associate Professor of Surgery, Emeritus, Medical School, at Harvard University, on "War, Its Tolls and Its Tributes." The occasion included also a celebration of Dr. Primrose's eightieth birthday.

In April, 1941, the Board of Governors appointed Dr. C. H. Best to succeed Sir Frederick Banting as Director of the Banting and Best Department of Medical Research. He will continue as Professor of Physiology but will relinquish his appointments as Professor of Physiological Medicine and Associate Director of the Connaught Laboratories. The University is singularly fortunate in having available for this great appointment one who is not only in the front rank in medical research but one who through his association with the discovery of insulin is the natural successor to the chair which was established to commemorate that great event.

Another appointment of interest was that of Dr. Robert D. Defries who succeeds the late Dr. J. G. FitzGerald as Director of the School of Hygiene and of the Connaught Laboratories. Dr. Defries was associated with Dr. FitzGerald in these two institutions from the early days of their development and has been Acting Director for the past two years. His appointment ensures the maintenance of these University interests at a high level.

The close of the present year saw the retirement of Dr. George M. Biggs as Professor of Oto-Laryngology and of Dr. Wm. H. Lowry as Professor of Ophthalmology. These gentlemen have both felt that in spite of war-time the strain of directing the Department at the University and at the General Hospital, combined with private practice, was more than they could face for another year. They have, therefore, brought to a close a long and faithful service to University and Hospital. To fill the places left by their retirement, Dr. Angus Campbell has been appointed to the Chair of Oto-Laryngology and Dr. Walter W. Wright to that of Ophthalmology. Dr. Campbell has been a member of the General Hospital staff for many years and simply steps up to become Director but Dr. Wright who has been Head of the Department at the Hospital for Sick Children must transfer from that institution to the General Hospital.

Other promotions are as follows: Dr. W. G. Cosbie from Associate in Obstetrics and Gynaecology to Assistant Professor; Dr. D. M. Low from Senior Demonstrator in Obstetrics and Gynaecology to Associate; Dr. E. T. Waters from Assistant Professor of Physiology to Associate Professor; Dr. F. H. Fraser from Assistant Professor of Hygiene and Preventive Medicine to Associate Professor; Dr. J. Craigie from Assistant Professor of Epidemiology and Biometrics in the School of Hygiene to Associate Professor.

This year will forever stand out in the annals of the University of Toronto as the year of the death of Sir Frederick Banting. This is not the place for an extended reference to his life and work but it is appropriate that we should pause to reflect that this young man from a small Ontario community became one of the greatest benefactors of the human race and brought his Alma Mater to the very forefront among the universities of the world.

It is my sad duty also to refer to the death of Dr. Kennedy Crawford McIlwraith, Professor Emeritus in Gynaecology and Obstetrics. Dr. McIlwraith served the University long and well and whole generations of our graduates will remember him with gratitude.

W. E. GALLIE

FACULTY OF MEDICINE

MEDALS, PRIZES, FELLOWSHIPS, SCHOLARSHIPS AND BURSARIES

*Awarded by the Senate of the University  
Faculty of Medicine*

SIXTH YEAR

The Faculty Gold Medal.....	J. G. Watt
The Ellen Mickle Fellowship.....	J. G. Watt
The Chappell Prize in Clinical Surgery.....	W. E. Ortved
The William John Hendry Memorial Scholarship in Obstetrics and Gynaecology.....	J. G. Watt
The Ontario Medical Association Prize in Preventive Medicine.....	I. P. Weingarten
The David Dunlap Memorial Scholarship.....	J. G. Watt

UNDERGRADUATE

The David Dunlap Memorial Scholarships	
(a) Fifth Year.....	H. H. Fireman
(b) Third Year.....	Miss M. J. Forgie
(c) Special Third Year.....	F. W. Hanley, B.A.
The Ronald S. Saddington Medal in Pathology.....	E. W. Nancekivell, B.A. McMaster
The James H. Richardson Research Fellowship in Anatomy.....	Miss V. Ryder, B.A.
The John Copp Bursary.....	J. F. Murray
The B'nai B'rith Scholarship.....	J. P. G. Maroosis
The Baptie Scholarship.....	W. B. Arnup

GRADUATE

The Reeve Prize.....	J. C. Richardson, M.D. (Tor.), M.R.C.P. (London)
The Faulkner Medal in Psychiatry.....	E. S. Goddard, M.D. Western
The J. J. Mackenzie Fellowship in Pathology and Bacteriology.....	S. M. Hudecki, M.D.
The Lister Prize in Surgery.....	F. H. Cote, B.A., M.D.

REGISTRATION OF STUDENTS IN THE FACULTY OF MEDICINE

SESSION 1941-1942

	<i>Men</i>	<i>Women</i>	<i>Total</i>
First Year.....	185	20	205
Second Year.....	121	16	137
Third Year.....	125	3	128
Fourth Year.....	103	7	110
Fifth Year.....	96	10	106
Sixth Year.....	109	7	116
D.P.H.....	21	2	23
D.Psych.....	3	2	5
B.Sc. (Med.).....	..	1	1
Post-Graduate.....	1	..	1
Occasional.....	4	..	4
Post-Graduate Course on Fractures.....	26	2	28
	794	70	864

ANATOMY

*Under the direction of Professor J. C. B. Grant*

It is worth commenting on the fact that the outlook of Histology, now in charge of Dr. A. W. Ham, has changed considerably during the last decade, the tendency now being to study as living things the materials which comprise the human body and to consider them physiologically as well as anatomically. That



is to say, the structural alterations that the tissues undergo under different kinds and degrees of activity increasingly arrest our attention.

Although the study of the living cell, as in tissue cultures, has had an effect in bringing about this change, the rise of endocrinology has had a still greater influence and much of the fundamental research in this field has been performed by histologists. Anyone privileged to see the profound and sudden changes that certain hormones can produce in the architecture of the tissues can scarcely refrain from regarding (and teaching) Histology as the study of living material.

During the past few years, and largely as a result of experimental work undertaken in this Department, much new histological material, illustrating the effects of the internal secretions and therefore of clinical significance, has been added to the sets of class slides. Since the study of an increasing number of slides happens to be associated with a decreasing amount of available teaching time, the microprojector is proving a remedy of value and is exemplifying the proverb that for every ill there is an antidote.

In the Neurology Course, now in charge of Dr. C. G. Smith, the evolution, the development, the histology, and the gross anatomy of the central nervous system and of the special senses are now all taught together and by one teacher. This has the advantage of allowing appropriate subject matter to be introduced at the most appropriate times and it makes for better cohesion and better co-ordination; it also abolishes unnecessary duplication.

The dissection of the brain is planned, in the main, to display the sensory and motor tracts in their continuity rather than piecemeal by regions. Thus, the neurone chains are learned systematically or functionally. Were time conceded, it would be desirable to dissect the brain twice; the first time by regions, the second by systems.

Many of the sulci and gyri and details of minor importance to the average medical student are omitted. An effort is made to make available to the student for his future use such significant anatomical details as are required in the understanding of experimental and pathological lesions of the central nervous system.

Two of our demonstrators, who were preparing themselves for the primary examination of the Royal College of Physicians and Surgeons, resigned before the end of the session in order to accept commissions in the Navy, thus placing what they regard as their duty before their own interests. Dr. W. J. Winthrop received his commission in January; Dr. W. D. Flatt received his in May.

Dr. Ross MacKenzie, who has become accustomed to obliging the Department by coming to its aid when the staff is depleted temporarily, again stepped into the breach. Harry C. Elliott, M.A., who has acted as assistant in Histology for several years, was recently admitted to the degree of Ph.D., the subject of his thesis being—the distribution of the motor nerve cells in the normal human spinal cord.

In addition to the (57) dental students studying Anatomy in the Department and to the (7) third-year B. & M. students and (7) fourth-year B. & M. students, extension courses in Anatomy are also conducted for (21) graduate nurses, (43) students in the first year Physiotherapy, (33) students in the second year Physiotherapy, (61) students in the first year Occupational Therapy, (37) students in the second year Occupational Therapy, (30) Junior Margaret Eaton students, (34) Senior Margaret Eaton students, (18) students taking Physical Education, and (22) Optometrists. These occupy much of the time of the teaching staff.

Dr. Grant was recently appointed an associate editor of the *Anatomical Record*, an appointment which signifies the increasing sympathy and understanding that exists between the United States and ourselves.



## RESEARCHES

*Under the direction of Professor A. W. Ham*

During the past year histological studies have been made on sections prepared in this Department from the tissues of animals given diabetogenic anterior pituitary extracts in the Department of Physiology, and treated in other ways to produce diabetes. These studies have been made in collaboration with the members of the Department of Physiology concerned in these experiments. In the earlier studies attention was directed chiefly at the pancreas and other endocrine glands. More recent studies have been in connection with the pancreas in new conditions and with the liver and the alimentary tract. A lesion of the liver, almost as characteristic as the degranulation and hydropic degeneration of the beta cells of the pancreas, has been shown to develop in animals made diabetic with extracts. The lesion fails to develop when the extract fails to produce diabetes. It thus appears to be the manifestation of an important diabetogenic factor, and further study regarding its nature should yield valuable information regarding the as yet mysterious role of the liver in diabetes. Following observations of Dr. Campbell of the Department of Physiology to the effect that diabetogenic extracts cause gastro-intestinal upsets with intestinal bleeding, studies were made on lesions of the rectum in affected animals. These in their gross appearance simulated mucous colitis. Sections of these lesions revealed great congestion of the mucosa and a swollen vacuolated gut musculature which suggested that glycogen accumulation in the smooth muscle of the alimentary tube was the primary basis for the intestinal disturbance.

Following studies made by Dr. Haist of the Department of Physiology which showed that starvation, insulin administration, or fat feeding reduced the insulin content of the pancreas, histological studies of the pancreas of these animals concerned were made in collaboration with Dr. Haist. These revealed that in these conditions the beta cells of the pancreas contained scarcely any of their specific granules. Previous studies showed that overwork can produce degranulation of the beta cells and the degranulation so produced is associated with degeneration. This new study shows that a lack of granules in beta cells can also be caused by underwork and that this change is not associated with degeneration.

In some studies made jointly with Dr. Tisdall and Dr. Drake of the Hospital for Sick Children, it was found that a prolonged calcium deficiency during the growing period of an animal's life resulted in a skeleton with a scanty amount of bone. The articular cartilages of joints of animals thus treated had scarcely any bony support and the bone of the vertebral column was only a fraction of the thickness of that of the controls. That the developing vertebral column can be so affected by a dietary deficiency suggests the possibility of diet being a factor in the ability or inability of the vertebral column later to withstand trauma without alterations to its structure.

Miss V. Ryder, a post-graduate student in the Department, has found that a prolonged phosphorus deficiency, induced by feeding berillium to rats, causes a 10 per cent decrease in the haemoglobin content of the blood from that of pair-fed controls. A prolonged phosphorous deficiency was found to have no effect on the incidence of dental caries. Other tissue manifestations of phosphorus deficiency are being studied.

Mr. Gracent Eidt, a post-graduate student in the Department, has found that in several families of animals the interstitial cells of the testis are more numerous and more active in the full-term foetus than they are shortly after birth. This suggests they are stimulated during foetal life by certain of the hormones of pregnancy. Mr. Eidt has also studied the effect of anterior pituitary extracts on the repair of bone and after many experiments has been unable to find that anterior pituitary extracts containing the growth principle exert any marked effect upon the growth of callus.



*Performed by Dr. C. G. Smith*

Dr. Smith has studied the incidence of atrophy of the olfactory nerves in man. It was discovered that the olfactory nerves are not uncommonly partially atrophic and may be completely so. It was found that of 163 olfactory bulbs 17.7 per cent had normal olfactory nerves, that 13.5 per cent had lost all their olfactory nerves, and that 55 per cent had lost more than  $\frac{3}{5}$ ths of their olfactory nerves. The age incidence—that is to say, the relation of atrophy to age—is now being investigated. Dr. Smith investigated the destruction and regeneration of the olfactory mucous membrane of the frog following the application of 1 per cent zinc sulphate. These experiments confirmed the findings obtained last year. The time required for regeneration was found to be 70 days. He also investigated changes in the olfactory mucous membrane of the rat produced by prolonged inhalation of formaldehyde. No results are as yet available. He is investigating the changes in the volume of the brain due to anoxia.

The Head of the Department has for nearly a year been engaged in preparing a comprehensive series of illustrations of dissections to be published by Messrs. Williams and Wilkins.

#### PUBLICATIONS

HAM, A. W. "The new magic bullets of chemotherapy" (*Saturday Night*, May 24, 1941, p. 28).  
——— and BALDWIN, K. W. "A histological study of the development of the lung with particular reference to the nature of alveoli" (*Anatomical Record*, Nov., 1941).

#### BIOCHEMISTRY

*Under the direction of Professor Hardolph Wasteney*

The only changes made in the staff have concerned junior teaching Fellows. There have been no changes in the course in Biochemistry given to the medical students.

The senior members of the staff were in charge of the courses they conducted in previous years. Professor Wynne gave the lectures on Biochemistry in the honour course for students in third-year Household Economics, Chemistry, and the General course, and on Zymology for fourth-year Arts and graduate students. Professor Young conducted the courses in Biochemistry for third-year students in the Biology, Biological and Medical Sciences, and Physiology and Biochemistry courses. He shared also with Professor Wynne in the lectures to fourth-year B. & M. students, and conducted an advanced laboratory course in Biochemistry for graduate students. Dr. B. F. Crocker was in charge of the lectures and laboratory work given to third-year dental students. Professor Wasteney conducted the courses in Biochemistry given to second- and third-year medical students, and lectured for part of the term in the course given to first-year medical and dental students on the History of Science and Civilization.

Two of the students who had graduated from the B. & M. course and were in the intermediate year before proceeding to fourth-year Medicine took work in Advanced Biochemistry and in Zymology and spent some time on a research problem in Biochemistry.

One student from the Department completed the requirements for the M.A. degree and two for the Ph.D., and these degrees were conferred at the spring convocation.

Some consideration was given to the prescription for the B. & M. course which is deficient in practical work in Biochemistry, and a three-hour laboratory has been added in the third year of that course.

The total number of students registered in the Department during the session 1940-1 was 434. This number was made up of 224 medical students, 15 students of the B. & M. course, 9 Chemistry, 7 P. & B., 11 Biology, 8 General, 52 Household



Economics, 28 Household Science, 54 Dentistry, 1 Food Chemistry, 3 C.M. & G., and 22 Graduates. Of the graduate students 9 were candidates for the Ph.D. degree, 9 for the M.A., 3 for the M.S.A., and 1 for the M.A.Sc. Seven were taking Biochemistry as a minor for degrees in other departments, and 15 were taking their major work in Biochemistry.

### RESEARCHES

Dr. Jeanne Manery Fisher has continued, with Mr. S. J. Slinger, the investigation of the electrolyte changes in, and the permeability of, developing fish eggs and larvae. The results showed that both whitefish and trout eggs present a unique problem in permeability by their ability to absorb sodium and potassium during the course of their development, from a dilute solution against a high concentration gradient. It was proved that these changes occurred in the embryo itself and not in the perivitelline space or outer membrane (chorion) which, with the embryo and yolk sac, comprise the egg.

The relation of the electrolyte composition of the blood and tissues of female fish to that of oviduct eggs was determined.

In collaboration with Mr. J. E. Moore and Dr. K. C. Fisher of the Department of Zoology, the influence of salts on the formation of the chorion and perivitelline space of freshly shed trout eggs was studied. It was found that a trace of calcium was necessary for the "hardening" which occurs just after shedding and which is so essential in preventing injury due to handling.

Experiments on the possible role of electrolytes in the etiology of shock, which were begun in the Department of Physiology last summer with Dr. C. H. Best and Dr. D. Y. Solandt, were continued and extended throughout the year to include studies of potassium metabolism in dogs.

#### *Under the direction of Professor A. M. Wynne*

The investigation of the properties and the formation of the phosphatase in the duodenal mucosa of rats, initiated two years ago with the collaboration of Miss M. Chernovsky and H. Z. Sable, has been continued by Miss M. Biehn and Miss E. A. Macpherson. The optimum conditions for the activity of the enzyme *in vitro* have been established with greater precision so that it is now possible to undertake with more assurance investigations which are concerned with the quantitative determination of the phosphatase activity of the intestinal mucosa and with factors which may influence the formation of the enzyme. Through the co-operation of Professor R. E. Haist of the Department of Physiology a preliminary study of the effects of adrenalectomy on phosphatase activity was made. Miss Biehn's work was supported by the National Research Council.

F. L. Root was engaged, until December 1, 1940, in further studies of toxin formation by *C. diphtheriae*. At that time he was ordered to active duty as an officer in the ordnance branch of the United States Army.

C. W. Shen has investigated the energy of activation of the phosphatase of *saccharomyces cerevisiae*. For this purpose three different substrates for the enzyme were employed, the hydrolysis of each of which was followed at two optimum pH levels, one in the acid and the other in the alkaline pH range. In all six cases the value of the energy of activation was found to be approximately 10,000 calories and was constant over a considerable range of temperature. Mr. Shen holds a scholarship which was granted by the Chinese government.

J. Tuba has continued the investigation of factors affecting the formation of phosphatase in yeast grown in synthetic culture media. The results of his work were incorporated in a thesis for the Ph.D. degree.

#### *Under the direction of Professor L. Young*

S. H. Zbarsky has been engaged in a chemical study of mercapturic acid formation and of its excretion, as a conjugate, in the urine of rabbits which had



been fed a variety of cyclic hydrocarbon compounds. The purpose of this study is to obtain further information concerning the influence of cyclic hydrocarbons on sulphur metabolism. It is still incomplete and is being continued.

A. D. Barton has continued his work on the preparation and purification of a number of aryl hydrogen sulphates and their salts, with a view to further study of the conjugation as sulphates of aryl compounds in the organism.

D. H. Laughland has supplemented Mr. Barton's work by a study of the chemistry of aryl hydrogen sulphates and of methods for their accurate determination in urine.

Lung-hsiang Chang has established and standardized methods for the determination of cyclic hydrocarbons in urine of rats and rabbits to which such hydrocarbons had been previously administered. Following the administration of naphthalene to rats and rabbits there is excreted a compound which, on acid decomposition, gives rise to naphthalene. Mr. Chang has made quantitative estimations of the naphthalene thus liberated and has studied various factors which influence its liberation. He described his results in a paper which he presented to the Royal Society of Canada at its May meeting.

Professor L. Young and Dr. B. F. Crocker have conducted and are continuing research on a war problem.

#### PUBLICATIONS

COLLIER, H. B. "The problem of plastein formation. I. The formation of a plastein by papain" (*Canadian Journal of Research*, B, vol. XVIII, 1940, pp. 255-63).

—————"The problem of plastein formation. II. The chemical changes involved in plastein formation by papain and by pepsin" (*Canadian Journal of Research*, B, vol. XVIII, 1940, pp. 272-80).

—————"The problem of plastein formation. III. A note on the complexity of peptic plastein in urea solution" (*Canadian Journal of Research*, B, vol. XVIII, 1940, pp. 305-8).

FISHMAN, W. H. "Studies on B-glucuronidase. III. The increase in B-glucuronidase activity of mammalian tissues induced by feeding glucuronidogenic substances" (*Journal of Biological Chemistry*, vol. CXXXVI, no. 1, 1940).

MANERY, J. F. and SOLANDT, D. Y. "Electrolyte changes in traumatic shock" (*Proceedings of the American Physiological Society*, 1941, p. 188).

#### HISTORY OF MEDICINE

*Under the direction of Professor Jabez H. Elliott*

The course of lectures prescribed was given to the three senior years, each year having its own separate course.

As Chairman of the Section of Historical Medicine of the Canadian Medical Association, I have prepared programmes for two sessions of that Section at the Winnipeg meeting.

At the annual meeting of the American Association of the History of Medicine the honour was paid the University in my election as President after two years as Vice-President of the Association, and I was again appointed representative on the Permanent Committee of the International Association of the History of Medicine. The activities of this later Association are necessarily in abeyance during the war.

For an address before the Canadian Medical Association on "The Early Days of the Toronto School of Medicine" a further series of lantern slides have been prepared and added to the collection for teaching.

#### HYGIENE AND PREVENTIVE MEDICINE

*Under the direction of Professor D. T. Fraser*

The enrolment of graduate students in the course for the diploma in Public Health for the session 1940-1 numbered twenty-seven as compared with seventeen



last year. The following provinces were represented: New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia. One student enrolled was from China and one from the British West Indies. Eleven students were Rockefeller Foundation Fellows and three were Connaught Laboratories Fellows. Including the students of this year, the total number enrolled since 1911 is 228.

As previously, courses of instruction in Bacteriology, Immunology, and Medical Protozoology were given to these students in the course leading to the diploma in Public Health and also to suitably qualified graduate students. It is gratifying to note that the enrolment of students in the course for the diploma in Public Health was the highest since the initiation of the course in 1911. The previous highest enrolment was twenty students in 1939-40. At the present time there is urgent need for men in preventive medicine and public health in Canada, both for civilian duties and with the armed forces. Many of the graduates of the University of Toronto with the diploma in Public Health qualifications are serving in responsible positions on active service with the Army, Navy, and Air Force.

In accordance with the plan adopted in this Department the class of 116 students in the fifth year in Medicine was divided into tutorial groups. Through the loss to this Department and the School of Hygiene of Lieut.-Colonel M. H. Brown, Major D. L. MacLean, Flying Officer J. M. Mather, and Captain E. L. Davey, it is becoming increasingly difficult to conduct the teaching under the tutorial system.

The field course for fifth-year medical students was held in the spring from May 14 to 31. The resources of the Department were taxed to the utmost in offering the instruction in the field course to the whole class of fifth-year medical students in the spring in one group in place of two as formerly. The change was necessitated by the decision of the Faculty to accelerate the time of graduation of students in Medicine in order to meet the emergencies of the war. It is a pleasure to acknowledge the fullest co-operation of the many individuals who generously gave their time, and particularly the Department of Health, Ontario, and the Department of Public Health, Toronto, for assistance in the conduct of the field course.

Laboratory courses and lectures were given as usual to students in the second year in Pharmacy, second- and third-year Household Science and Household Economics, and to students in the School of Nursing.

The enrolment for the session has been as follows:

Candidates for the Diploma in Public Health.....	27
Graduate students.....	10
Faculty of Medicine, fifth year.....	116
Faculty of Household Science, second and third years.....	35
Faculty of Arts, second and third years.....	98
Ontario College of Pharmacy, second year.....	93
School of Nursing.....	75
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	454

RESEARCHES

Dr. Ronald Hare has continued his studies on the virus of influenza in which he has had the assistance of Dr. W. J. Auger and Dr. Laurella McClelland. Through the generosity of the International Health Division of the Rockefeller Foundation, a supply of chick embryo influenza A vaccine was made available for trial. A group of one hundred persons was inoculated in Toronto and smaller groups at the Laboratory of Hygiene, Department of Pensions and National Health and the Animal Disease Research Institute. The behaviour of these groups has been intensively studied, specimens being obtained from every case



of sickness among them. Attempts to adapt the recently discovered virus, influenza B of Francis, to the egg are in progress so that an experimental vaccine may be produced for protection against this virus as well. Studies, begun on the outbreak of war, on haemolytic streptococcal infection of wounds are being continued. Further evidence has been obtained that these organisms are not present in the wound at the time of infliction, but enter it some time later. The most important source is the nasopharynx of someone who dresses the wound, and studies have been carried out on the method by which this usually occurs. Not only are such carriers able to expel the organisms when they speak or cough but they may also contaminate their hands or their clothing. Unless particular care is exercised they may very easily cause infection of open wounds which they may attend.

For further investigations on this problem, Dr. Hare has been provided by the Associate Committee on Medical Research of the National Research Council with the services of Dr. Reba E. Willits. Their work is being carried out in conjunction with Dr. W. E. Gallie and members of the Department of Surgery. In accordance with the conditions under which these grants are awarded, a report of this work will be furnished to the National Research Council and further details cannot be given here.

Dr. Ella Kuitunen has extended her study of human intestinal parasites. She has completed a comprehensive clinical trial of the curative value of phenothiazine in enterobiasis (pinworm) infection of children and adults. This study is of special value since the only other report of this nature in the literature on the use of phenothiazine was upon a very small number of persons and not of a critical character. Her results indicate that the drug is very effective in the cure of enterobiasis and in a smaller dosage than has been suggested heretofore. It is a pleasure to acknowledge the co-operation of Dr. Alan Brown and his associates and Dr. Monypenny and Dr. Mulock of the Children's Aid Society. A recent survey for enterobiasis in 178 children living in institutions and also in a group in foster homes showed the high prevalence of pinworm infection, namely that 54 per cent were infected. Dr. Kuitunen, through facilities offered by the Women's College Hospital, examined 240 patients for trichomonas vaginalis infection. Of these 35 per cent showed the presence of this parasite.

Dr. K. Sternbach working under grant from the Banting Research Foundation has continued the testing of the activity of a large series of new organic compounds. Eighty-eight such compounds were tried for their effect upon mice injected with meningococcus and mucin. Of the series, ten compounds showed definite activity. Dr. Sternbach has developed a chocolate agar medium which both accelerates and enhances the growth of the gonococcus. Experimental conjunctival gonococcus infection in rabbits was achieved in rabbits which were pretreated with benzine in oil. Mr. Goddard collaborated in this work.

Mr. R. J. Wilson has held the appointment of Fellow in this Department. He has continued his interest in staphylococcus food poisoning and has contributed a number of papers to the literature upon this subject. The bacteriological study of cultures isolated in a recent epidemic in Hamilton has been carried out. The epidemiological investigation has been made by Dr. J. Edgar Davey, Medical Officer of Health, Hamilton, who kindly furnished the cultures. Mr. Wilson has successfully carried out an intensive study of the factors concerned in the growth of *H. pertussis* on Hornibrook's casein hydrolysate medium with a view to its use in the preparation of vaccine for human use. This vaccine has been submitted to clinical trial among children.

Dr. Frieda Fraser determined the agglutinative types of haemolytic streptococci among troops with scarlet fever and among civilians in Toronto and Port Arthur. Comparison of the types found in different areas and from various sources was of considerable interest from an epidemiological standpoint. There-quarters of the cases of scarlet fever among troops belong to one type. In



contrast to the strains isolated from troops there is a wide variety of types among civilians.

Dr. H. Plummer has been studying the toxins of the gas gangrene group of anaerobes with a view to the preparation of suitable antigens for active immunization. The activity of new organic preparations against experimental infection of mice with activated spores of the gas gangrene group has been explored.

Through the co-operation of the Department of Health, Ontario, and Dr. H. H. Harvie of Espanola, a new precipitated diphtheria toxoid prepared by Dr. P. J. Moloney has been under investigation. The diphtheria carrier survey of school-children in Toronto has been continued with the co-operation of Dr. A. B. Moffat and the Department of Public Health, Toronto. The effectiveness of concentrated diphtheria toxoid administered intranasally as a reimmunizing dose has been explored. The response in antitoxin is rapid and attains high levels. The effectiveness of a mixture of concentrated tetanus and diphtheria toxoids used intranasally is under investigation.

Dr. P. J. Moloney has devoted much of his time to the preparation and purification of antigens, particularly tetanus and diphtheria toxoids. He has made some very practical improvements in the flocculation test for assaying tetanus antitoxin. Dr. Edith Taylor is continuing her work in the use of synthetic media in the preparation of toxins, particularly of the anaerobic group.

#### PUBLICATIONS

DOLMAN, C. E. and WILSON, R. J. "The kitten test for staphylococcus enterotoxin" (*Canadian Public Health Journal*, vol. XXXI, 1940, p. 68).

FRASER, D. T., DAVEY, E. L., and HALPERN, K. C. "Antitoxin response to concentrated toxoid applied to the nasal mucous membrane" (*Canadian Public Health Journal*, vol. XXXI, 1940, p. 376).

HARE, R. "Active immunity to influenza in the mouse" (*Journal of Immunology*, vol. XL, 1941, pp. 267-79).

———"The expulsion of haemolytic streptococci by nasopharyngeal carriers" (*Canadian Public Health Journal*, vol. XXXI, 1940, p. 539).

———"Haemolytic streptococci in normal people and carriers" (*Lancet*, vol. I, 1941, p. 85).

———"The present status of influenza virus" (*Canadian Public Health Journal*, vol. XXXII, 1941, p. 49).

———"The prevention of streptococcal infection of wounds" (*Canadian Public Health Journal*, vol. XXXI, 1940, p. 407).

——— and RIEHM, W. "Long term variations in titer of neutralizing antibody" (*Journal of Immunology*, vol. XL, 1941, pp. 253-66).

——— and WILLITS, R. "Source and prevention of septic infection of wounds" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 230-7).

KUITUNEN-EKBAUM, E. "The incidence of human trichinosis in Toronto" (*Canadian Public Health Journal*, vol. XXXII, 1941, p. 78).

———"Intestinal parasites in children in Toronto" (*American Journal of Diseases of Children*, vol. LX, 1940, pp. 518-25).

———"Phenothiazine in the treatment of enterobiasis" (*Canadian Public Health Journal*, vol. XXXII, 1941, pp. 308-13).

———"Report of a case of *Dipylidium caninum* in a child" (*Canadian Public Health Journal*, vol. XXXII, 1941, p. 78).

———"A survey of entozoa in adults in a Toronto hospital" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 451-3).

MOLONEY, P. J. "The phosphatase test" (*Canadian Public Health Journal*, vol. XXXII, 1941, pp. 213-15).

——— and ORR, M. D. "The effect of certain constituents of ox bile on the Ramon flocculating value of diphtheria toxin" (*Transactions of the Royal Society of Canada*, vol. XXXIV, section 5, 1940, pp. 87-91).



- WILSON, R. J. "Laboratory procedures in staphylococcal food poisoning" (*Canadian Public Health Journal*, vol. XXXI, 1940, pp. 607-12).
- "Some improvements in the preparation of staphylococcus toxoid (abstract)" (*Canadian Public Health Journal*, vol. XXXI, 1940, p. 23).
- "Staphylococcal food poisoning" (*University of Toronto Medical Journal*, vol. XVIII, 1941, pp. 190-3).
- "The staphylococcus" (*Canadian Journal of Medical Technology*, vol. II, 1940, p. 49).
- "Staphylococcus toxin" (*Canadian Journal of Medical Technology*, vol. II, 1940, p. 119).

### MEDICAL JURISPRUDENCE

*Under the direction of Dr. K. G. Gray and Professor W. L. Robinson*

There was no change in the lectureship or the content of lectures. The legal lectures dealt with legal problems arising out of the practice of medicine and the status of the medical practitioner as an expert witness. An attempt was also made to portray the legal status of public and private hospitals. Some time was also devoted to the study of questions of jurisprudence arising out of committal of patients to mental institutions.

The pathological phases of this subject have been dealt with, as usual, in the lectures. The course has been made as practical as possible, dealing particularly with the ordinary run of cases the general practitioner is liable to meet with in his practice.

We have been helped considerably this year by the assistance of Dr. Smirle Lawson, Supervising Coroner for the Province of Ontario, who, besides giving lectures on the procedure in a coroner's court, has taken up some of the practical work, such as lectures on infanticide, rape, abortions, etc. Our students have always been welcomed to his court where he has gone to considerable pains to explain their procedure.

### MEDICINE

*Under the direction of Professor Duncan Graham*

No changes have been made in the general plan of undergraduate instruction in Medicine. Although ten members of the staff have left the Department for service with the military forces, other members of the staff assumed extra hospital and teaching duties, which made it possible to give the regular course of clinical instruction. During the year special stress was given to medical problems related to the war.

The Department regrets to report that Dr. A. A. Fletcher, Associate in Medicine, has been forced through illness to give up his hospital and teaching duties. It is gratifying to report that he is making satisfactory progress and it is hoped that he will be able to resume his work in the coming year.

When the last Annual Report was presented seven members of the staff—Drs. H. M. Gray, A. R. Hagerman, H. H. Hyland, W. A. Oille, J. C. Richardson, H. E. Rykert, and W. P. Warner—had enlisted. Since then five others have joined the Canadian Army Active Force: Dr. W. Hurst Brown is at Borden Military Hospital, Drs. A. W. Bagnall and J. A. Dauphinee are attached to No. 7 Field Ambulance, and Drs. R. B. Kerr and Ian Macdonald to No. 2 Casualty Clearing Station. Lieut.-Colonel W. P. Warner, who has made a satisfactory recovery from his illness of last year, is attached now to the Inspection Branch in the Office of the Director General of Medical Services. The Department regrets to report that Dr. H. M. Gray, who was invalided home from Overseas, has been forced to accept a discharge from the Army on account of ill health. Fortunately his health will permit him to resume his teaching duties in the coming year.



The Alexander McPhedran Research Fellow in Clinical Medicine for 1940-1 was Dr. W. F. Greenwood. At the end of the session he enlisted for active service with the No. 7 Field Ambulance.

Members of the staff of military age, without previous military training, have joined the Non-Permanent Active Militia in order to qualify themselves as officers in the Royal Canadian Army Medical Corps and be ready to serve when the occasion arises.

### RESEARCHES

The war has seriously affected the clinical investigation programme of the Department. Work in this field has been confined to the completion of certain studies and a limited investigation of certain problems related to the war.

Drs. Richardson and Hyland have published the report of their clinical and pathological findings in a series of cases of subarachnoid and intracranial haemorrhage caused by "berry" aneurysms. Dr. Richardson, who was responsible for the pathological studies in this report, was awarded the Reeve Prize by the Faculty of Medicine in recognition of his work.

Dr. Cleghorn, working in association with Dr. Philip Greey of the Department of Bacteriology, has demonstrated that the presence of shock is not a contraindication to the use of sulphonamide drugs for the prevention and treatment of infection.

Dr. Cleghorn and Mr. A. P. W. Clarke, Research Fellow in Medicine, have been studying the nature of the changes in the tissues of the gastro-intestinal tract occurring in adrenal insufficiency and in surgical shock. The results of the chemical analyses made by Mr. Clarke have provided valuable information as to the nature of the changes occurring in these two conditions. A report of this work will be made shortly to the National Research Council which has given financial support to this investigation as a war problem.

Dr. A. E. Parks, working in association with Dr. Shanks of the Department of Pathology, attempted to produce renal lesions in rabbits by the intravenous injection of serum from rabbits treated with intraperitoneal injections of degenerated rabbit kidney emulsion. The results of the experiments were essentially negative.

Dr. Cleghorn and his associates have continued their investigation of the cause of vascular failure in adrenal insufficiency. In a report recently published, they conclude that exhaustion of sympathin, at least in the splanchnic region, is not the cause of vascular failure in adrenal insufficiency.

During the past three years Drs. Fletcher and J. W. Graham have carried out a controlled clinical study on the therapeutic and toxic effects of gold therapy in fifty-five cases of rheumatoid arthritis. Gold therapy was combined with rest in bed and the regular treatment given arthritic patients. They report a more rapid improvement and a faster graduation into the inactive phase of the disease than was observed before the institution of gold therapy. 19 per cent of cases recovered with apparent inactivity; 50 per cent were much improved; 19 per cent improved; and 11 per cent showed no change. Toxic manifestations, usually of a mild character, were observed in 59 per cent of the cases.

Drs. Dauphinee and Hepburn investigated the pathological physiology in two cases of chronic cyanosis. The cyanosis in the first case was found to be due to methaemoglobin in the blood which was measured quantitatively by comparison between the oxygen capacity and the iron content of the blood. The methaemoglobinaemia could be relieved entirely by the administration of methylene blue, but its cause could not be determined.

In the second case, the chronic cyanosis was due to inadequate oxygenation of the blood in the lungs, the arterial blood being less than 70 per cent saturated with oxygen. This was caused by a highly vascular tumour permitting free



communication between pulmonary artery and pulmonary vein. The condition was diagnosed clinically as an haemangioma of the lung and was cured by pneumonectomy. A detailed report of the findings in this case will be published shortly.

The rapid recognition of lead poisoning is frequently of clinical importance. Dr. W. R. Campbell, by using diphenylthiocarbazone, has devised a procedure suitable for clinical purposes by which minute amounts of lead may be detected in small amounts of urine.

#### PUBLICATIONS

BAGNALL, A. W. "The use and abuse of daganan" (*University of Toronto Medical Journal*, vol. XVIII, 1940, p. 5).

BATES, G. "What are we fighting for?" (*Health*, vol. IX, 1941, p. 15).

BOYER, G. F. "The psychoneuroses of war" (*Canadian Medical Association Journal*, vol. XLIII, 1940, p. 53).

BROWN, W. HURST "The use of the newer drugs" (*Canadian Medical Association Journal*, vol. XLIV, 1941, p. 485).

CAMPBELL, W. R. "A dithizone test for lead in urine" (*Canadian Physiological Society*, Nov., 1940).

CLEGHORN, R. A. "Recognition and treatment of Addison's disease" (*Canadian Medical Association Journal*, vol. XLIV, 1941, p. 581).

ARMSTRONG, C. W. J., AUSTEN, D. C., and McVICAR, G. A. "Response of the denervated nictitating membrane and of blood pressure to sympathetic nerve stimulation in adrenalectomized cats" (*American Journal of Physiology*, vol. CXXXII, 1941, p. 542).

FOWLER, J. L. A., and CLARKE, A. P. W. "The effect of some pressor drugs on healthy adrenalectomized dogs" (*Canadian Physiological Society*, Nov., 1940).

DAUPHINEE, J. A. and HEPBURN, J. "Chronic cyanosis: pathological physiology in two cases" (*Canadian Physiological Society*, Nov., 1940).

GRAHAM, J. W. "Oral manifestations of vitamin deficiency" (*Canadian Dental Journal*, 1940).

HAMILTON, F. C. "Significance of gallop rhythm" (*Canadian Medical Association Journal*, vol. XLIV, 1941, p. 260).

PARKS, A. E. and SHANKS, G. "Studies on experimental lesions in the kidneys of rabbits" (*Journal of Laboratory and Clinical Medicine*, vol. XXVI, 1941, pp. 950-6).

PRENDERGAST, D. J. and PHAIR, W. B. "A case of psittacosis" (*Canadian Medical Association Journal*, vol. XLIV, 1941, p. 597).

RICHARDSON, J. C. and HYLAND, H. H. "Intracranial aneurysms: a clinical and pathological study of subarachnoid and intra-cerebral haemorrhage caused by berry aneurysms" (*Medicine*, vol. XX, 1941, pp. 1-83).

WIGHTMAN, K. J. R. "Some general principles of sulphonamide therapy" (*Ontario Medical Association Bulletin*, vol. VIII, 1941, p. 118).

#### OBSTETRICS AND GYNAECOLOGY

*Under the direction of Professor W. A. Scott*

The teaching of the Department is now proceeding satisfactorily with the completed changes in the curriculum which provide for a more adequate training of the students in Obstetrics. The inclusion of a course in practical training for the fifth year, carried out in St. Michael's Hospital and Western Hospital, is working very satisfactorily, and its results are seen in the final examinations of the students in their sixth year.

The war has added considerably to the work of the staff. Both senior house surgeons on the service have enlisted, and during the year Dr. George Hendry and Dr. M. C. Watson left the staff for service in His Majesty's forces.

The decision of the Faculty to lengthen the teaching year to ten months made it impossible to carry out the summer courses which have been in operation for several years.



## RESEARCHES

Dr. W. G. Cosbie has completed, and recently presented, a study of complications following radiological treatment of gynaecological carcinoma. Although the risk of such complications under the present method of intensive treatment is considerable, the improvement in the late results would appear to justify the taking of such risks.

Dr. Nelson Henderson has made a valuable study of granulosa cell tumours of the ovaries, on which subject he has published one paper, and is preparing another for publication this fall.

The use of chemotherapy in the treatment of Neisserian infections has lessened the work of the Special Treatment clinic, and has apparently reduced the number of cases of salpingitis seen in the wards.

Dr. John Mann has continued his investigation on "Toxaemias of Pregnancy," and has recently presented the results in a paper at the Canadian Medical Association.

## PUBLICATIONS

COSBIE, W. G. "Pitfalls in gynaecological diagnosis" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 133-6).

FRAWLEY, N. D. "The treatment of disproportion" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 38-40).

GOODWIN, J. C. "Gonococcal pelvic inflammation" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 136-41).

HENDERSON, D. N. "Diagnostic curettage" (*Bulletin of the Academy of Medicine*, Toronto, vol. XIV, no. 5).

—————"Granulosa and theca cell tumours of the ovary" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 20-3).

—————"The incidence of endometrial hyperplasia with uterine fibroids and external and internal endometriosis (adenomyosis)" (*American Journal of Obstetrics and Gynaecology*, April, 1941).

JOHNSTON, H. W. "The termination of pregnancy before the period of viability by abdominal hysterotomy through the lower uterine segment" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 552-4).

LOW, D. M. "Caesarean section" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 280-4).

WATT, L. "Benign lesions of the cervix" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 141-4).

## OPHTHALMOLOGY

*Under the direction of Professor W. H. Lowry*

The students have been attentive to their clinics and lectures and have shown an increasing interest in the subject to the extent of equipping themselves to take care of eye diseases and injuries which are apt to come to their consulting rooms. A large proportion of the students have purchased ophthalmoscopes during the session and are thus in a position to improve their knowledge by practical experience.

This year the lectures were held at the beginning of the session at which time there were several cancellations of lectures because of military work, games, and so on. This was unfortunate because an attempt was made during the lectures to prepare the students to make more use of the clinics which followed during the session.

In the laboratory, under Dr. Hodgson, 165 specimens from the wards, from the city and from various points in the province, were examined and reported upon. The Museum specimens have thus been increased and this is of great interest to visitors.



The staff has been very attentive to their clinics and teaching and have given freely their advice and help to interested students after hours.

### OTO-LARYNGOLOGY

*Under the direction of Professor G. M. Biggs*

Although the teaching staff has been reduced by leave of absence granted to those on active military duty, the work has been as thoroughly supervised as possible. The fifth-year study of the use of examining instruments and gross anatomy of the Ear, Nose, and Throat was carried out in three trimesters, the students being divided into three sections with individual observation under Junior Demonstrators. As in former years, the graduating class received individual instruction during ten clinical hours and nine didactic lectures.

Dr. D. E. S. Wishart of our staff has been representing Oto-Laryngology on the Central Programme Committee of the Canadian Medical Association; also he has been made a member of the Board of Trustees of the Research Fund of the American Otological Society Incorporated.

### RESEARCH

Dr. J. Grant Strachan has continued his investigations in Atrophic Rhinitis during the past year.

### PUBLICATIONS

STRACHAN, J. GRANT "Atrophic rhinitis or ozeana in children" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 158-61).

WISHART, D. E. S. Revision of the section "The surgery of the ear" in *System of surgery* by Dean Lewis.

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"Rhinology in children. Résumé of and comments on the literature for 1939" (*Laryngoscope*, Aug., 1940).

### PAEDIATRICS

*Under the direction of Professor Alan Brown*

### RESEARCHES

The study of the control of cross-infections under practical hospital conditions by the use of ultraviolet light together with air-conditioning is being continued. In wards equipped with cubicles, ultraviolet lights, and air-conditioning, the incidence of cross-infection has been only one-quarter that in wards where the infants were separated by partitions. The nasopharyngeal flora of infants and the nurses and physicians in contact with them is being followed in an effort to trace the source of the cross-infections.

In co-operation with the Connaught Laboratories an immune rabbit serum for the prevention and treatment of whooping cough has been developed. This is now undergoing clinical trial. The bactericidal power of human blood on the meningococcus is being studied and work is in progress on a method of typing this organism using normal guinea-pig blood.

Incidence studies are being made on heart disease in school-children. The effect of sulfanilamide on acute and chronic rheumatic infections in children is being studied. Using the x-ray, new methods have been developed to evaluate the condition of the heart in the acute and convalescent stages of rheumatic fever.

During recent years reports have appeared upon the good effects of vitamins B1, B6, and E in the treatment of muscular dystrophy. Carefully controlled observations have enabled us to conclude that the administration of vitamins B1, B6, or E was not of definite value in the treatment of muscular dystrophy.



in the human. Work is in progress on the production of muscular dystrophy in animals by dietary measures.

The effect upon the infant of the oral administration of vitamin K to the pregnant woman at varying times before delivery has been determined. It has been found that the administration by mouth of vitamin K to the patient who arrives at the hospital in labour, provided that at least four hours elapses between the ingestion of the vitamin and delivery, increases the prothrombin content of the infant's blood to a height well above that which occurs in haemorrhagic disease of the newborn.

In co-operation with the Department of Horticulture of the Ontario Agricultural College at Guelph, studies are being continued on the vitamin C content of various Canadian fruits and vegetables, particularly tomatoes. The effect of variety difference, seasonal variation, cultural methods, and cooking upon the vitamin C content is being studied. Great differences have been found in the vitamin C content of canned tomatoes processed by different canners and in different packs of the same canner. This fact has been brought to the canners' attention by the Ontario Department of Agriculture in the hope that the canners may be able to produce a product having a uniformly high vitamin C content. Under ordinary commercial cold storage practice, Ontario spinach has been found to lose over 95 per cent of its vitamin C content while still remaining perfectly satisfactory from the taste and appearance standpoints. It is hoped that some means may be found to decrease this loss during storage.

In co-operation with the Department of Obstetrics, University of Toronto, the Dietetic Department of the Toronto General Hospital, and the Visiting Homemakers Association, studies have been completed on the influence of good and poor prenatal diets on the health and obstetrical course of four hundred women. Observations are continuing on the offspring of these women. Ninety women found to have poor diet and low income were supplied with certain essential foods daily throughout the latter half of the prenatal period. Each diet record was analysed in order to determine as closely as possible the amount of the individual food components received by the mothers. Studies of the blood phosphatase, vitamin C, and haemoglobin were made at intervals on both the mother and the child. Clinical observations and the laboratory investigations indicate that the prenatal diet has a striking influence on the health of the mother during pregnancy, labour, and convalescence. The diet during pregnancy also markedly affects the health of the child during the first few months of life. The incidence of miscarriage, prematurity, and stillbirth was very much less in those supplied with supplemented prenatal diet. The ability of the mother successfully to nurse her infant was better in the good diet group. The condition and progress of the baby in the hospital were better in the good diet groups. When examined at six months of age the babies born of mothers on a good or supplemented diet weighed more, were in better general health, and had suffered fewer illnesses during the first six months of life. There were more deaths from infections in the poor diet group. Studies of phosphatase in the mother's blood indicate the value of vitamin D in pregnancy.

In co-operation with the Dominion Departments of Agriculture and of National Health, we have devoted a good deal of attention to a consideration of the B group of vitamins in relation to national health. Nutritional surveys show that the Canadian people as a whole are not receiving the amount of vitamin B1 necessary for optimum mental and physical efficiency. It has been pointed out that the distribution in foods of the other members of the vitamin B complex parallels to a degree vitamin B1. The adequacy of the vitamin B complex as a whole in the Canadian diet is open to question.

Canadian agriculture produces foods which are rich in the various members of the B complex, particularly wheat and milk. At least one of our new Canadian rust-resisting wheats, which will soon constitute a large portion of the commercial wheats grown in the West, is very rich in vitamin B1. Unfortunately, in the



present process of milling, white flour retains only about one-sixth of the original vitamin B1 content of the wheat, a small percentage of the other members of the B group, and only one-seventh of the original iron. The retention of these valuable food elements now lost for human consumption is engaging the attention of members of the Department of Agriculture and various millers throughout Canada. The per capita consumption of Canadian flour has steadily decreased over the past forty years. If anything can be done to increase the use of Canadian wheat and flour through increasing its nutritional value, it is obviously of the greatest importance to Canada not only from the standpoint of improving the health of the nation but from the agricultural and economic standpoints. At the present time the Canadian government, through the Canadian wheat pool, is the owner of 350 million dollars worth of wheat. Co-operating with Dr. L. H. Newman, Dominion Cerealists, white flour has been produced experimentally which retains from two-thirds to three-quarters of the vitamin B1 originally present in the wheat, and an appreciable amount of the other B vitamins. It is hoped that white flour may be produced commercially in our Canadian mills which will carry a much greater proportion of the B vitamins than that carried by the baker's white flour as now commonly used. This it is hoped may be accomplished at no increase in milling cost and with the use of the present milling machinery. White bread made from this flour and 4 per cent skim-milk solids supplies appreciable amounts of the various members of the vitamin B complex. Studies of the public reaction to bread made from this flour indicate that it is acceptable to over 90 per cent of the people as a white loaf of bread. The use of this flour by our Canadian people in place of the present white flour would supply for nothing in the course of one year many millions of dollars worth of the B group of vitamins at drug-store prices. Probably no one dietary change would be of greater importance in improving the health and efficiency of the nation than the substitution of this white flour with vitamins retained for the white flour now being used in Canada.

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## PATHOLOGICAL CHEMISTRY

*Under the direction of Professor Andrew Hunter*

The position of Pathological Chemistry as a fourth-year subject has this disadvantage, that the student engages upon it before he has had any experience of clinical medicine and before, therefore, he can appreciate its value or obtain practice in its application. From this point of view it might be better to postpone the subject to the fifth year; but to that course there would be a still more serious drawback, for it would create a gap of one year during which the student would be taught no chemistry whatever, and during which he would be apt to forget those biochemical facts and principles which are the foundation and necessary precursors of his work in this Department. As one way of easing the situation an arrangement has now been made with the Department of Pathology, whereby that Department will take up the subject of renal disease just before this one introduces the student to the methods employed for the estimation of renal function. This co-operation on the part of the Department of Pathology is greatly appreciated.

In a further effort to improve the teaching of Pathological Chemistry there was introduced this year a plan of concluding each laboratory session with a short tutorial period, during which each instructor, taking his own small group of students, sought by question and answer to elucidate and emphasize the meaning and the applications of the day's exercises. It is too early as yet to evaluate the success of this experiment.

The Department continues to suffer from the temporary absence on military service of Lieut.-Colonel R. W. I. Urquhart. This has thrown a considerable extra burden of teaching (cheerfully accepted) upon Dr. Nicholson and Dr. Selby. A permanent loss is the resignation of Dr. H. E. Woodward, who has accepted an appointment in the Food and Drug Division of the Dominion



Department of Pensions and National Health. Dr. Woodward had proved himself an excellent teacher and a valuable collaborator in research. Under existing conditions his place will be difficult to fill.

The number of students registered in the Department during 1940-1 was 230. These included 110 fourth-year medical students, 116 fifth-year medical students, and 4 graduate students. Of the last group two were taking Pathological Chemistry as their major subject.

### RESEARCHES

The Department has carried out as usual the routine determinations of basal metabolic rate required by the Surgical and Obstetrical services of the Toronto General Hospital. The total number of such determinations was 274. These were made on 191 patients, of whom 174 were surgical and 17 obstetrical and gynaecological.

The Department has undertaken also, as a service to the Surgical Department, determinations (12 in number) of thorotrast in spinal fluid after myelogram examination. In addition it has carried out about 1,500 routine urine examinations for the University Health Service.

Dr. Nicholson and Dr. Selby have continued their work on renal function in experimental unilateral kidney lesions. The effect of cyanide was studied and it was found that the effects in the intact animal differed somewhat from those reported by other workers for the excised kidney. The main difference was that no glycosuric was produced.

The work on the effect of staphylococcal infection on carbohydrate metabolism in rabbits which was being carried on in collaboration with the Department of Pathology and Bacteriology has been continued by Dr. Holman of the latter Department and by Dr. Nicholson. Definite decreases in carbohydrate tolerance, as evidenced by the occurrence of glycosuria and by changes in the glucose tolerance curve, were produced by repeated subcutaneous injections of staphylococcus toxin in rabbits on normal diets and by repeated subcutaneous injections with staphylococcus aureus in rabbits on a high carbohydrate diet.

Dr. Nicholson has completed one phase of work on the effect of high blood ureas on the acid base balance of serum in dogs, showing that when the blood urea is raised by urea injection some extra base, probably organic, appears in the serum.

Mr. Gornall, under the direction of Dr. Hunter, has confirmed and amplified last year's work on the mechanism of urea formation in the liver. Evidence has been accumulated which shows that at least one factor limiting the rate of urea formation in surviving liver tissue is the speed of the citrulline-to-arginine transformation.

Dr. Woodward, also working under the direction of Dr. Hunter, has continued his work upon the specificity of arginase, giving special attention to the quantitative measurement of the relative activity of the enzyme toward substrates of varying constitution.

Dr. Hunter and Mr. Downs have made quantitative measurements of the effect of a variety of amino acids upon the activity of arginase. The results are of great interest from a theoretical point of view, and have a practical bearing upon the use of arginase as a reagent in the analysis of proteins.

In a research carried out in co-operation with the Department of Medical Research Mr. MacArthur has extended his work on the lipide constituents of human atheromatous plaques so as to make the results quantitative as well as qualitative. The data now available make possible a detailed comparison of this fatty mixture with (similar) normal and pathological fats found elsewhere in the body. Definite proof has been obtained that the atherosclerotic plaques contain only a negligible amount of glyceride, a fact which may shed light on the



chemical mechanism underlying the specific deposition of cholesterol and cholesterol esters in atherosclerotic lesions.

Several members of the Department's staff have continued to take part in the programme of research in Aviation Medicine initiated under the late Sir Frederick Banting, in the Department of Medical Research.

The results obtained by Dr. Woodward and by Mr. Gornall were in part communicated to the Royal Society of Canada at its meeting in Kingston, May, 1941. Papers have been written and are now in the press: (1) by Mr. Gornall and Dr. Hunter on "A Colorimetric Method for the Determination of Citrulline," (2) by Drs. Nicholson and Archibald on "The Use of Micro-organisms in Sugar Analysis," (3) by Dr. Nicholson on "The Effect of High Blood Urea on the Acid-base Balance of Serum of Dogs," (4) by Dr. Nicholson and Dr. Holman on "Carbohydrate Metabolism and Staphylococcus Infection."

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#### PATHOLOGY AND BACTERIOLOGY

*Under the direction of Professor William Boyd*

The war has had its inevitable effect both on the teaching and the personnel of the Department. Owing to the time required for Military Training it has not been possible to give the full course of instruction in the fourth year on the examination of gross pathological specimens. For the same reason the course on General Pathology in the third year has had to be considerably shortened.

Dr. A. J. Kerwin, who occupied the position of Lecturer temporarily rendered vacant by Dr. Desmond Magner's absence on active service, has joined the R.C.A.F. He will be succeeded by Dr. L. S. Jolliffe, a graduate of Queen's University, with several years' training at the Mallory Institute of Pathology in Boston. Dr. A. L. Gordon and Dr. R. M. Taylor were unable to complete their work as Fellows as they were called up for military duties. Dr. W. G. Rice, the Fellow in Bacteriology, resigned his position early in the year to become Surgeon-Lieutenant in the R.C.N.V.R., and is now on active service. Dr. D. G. Greene of Buffalo spent three months as a voluntary Fellow on the autopsy service, and Dr. T. J. Moran of Pittsburgh one month on Surgical Pathology. Professor Edouard Morin of Quebec joined the Department for a month during the winter to study our teaching methods and our routine diagnostic procedures in Bacteriology.

Starting the course in Bacteriology in the first trimester has been found most satisfactory and fits in very well with the course in General Pathology, which begins in the second trimester after most of the work in Bacteriology has been given. The Department was pleased to offer facilities to seven Norwegian medical students for the continuation of their studies in Pathology and Bacteriology.

Work on the Bone Room in the Museum has been completed; this room now contains a useful collection of both dry and wet specimens, together with many coloured illustrations of pathological bone conditions. Work has been started on the two rooms containing specimens illustrating diseases of the liver, gall bladder, breast, female reproductive system, haemopoietic system, and ductless glands.

Room 80 has been lent temporarily to Dr. H. O. L. Fischer, Research Professor of Organic Chemistry, for purposes of micro-analytic analysis.



## RESEARCHES

During the year a number of investigations on material coming to autopsy were made, and several reports are to be submitted for publication. Dr. J. D. Duffin has reviewed seven cases of Addison's disease due to cortical atrophy. In addition, he has studied the subject of "superior pulmonary sulcus tumour" and concluded that these tumours are malignancies of the lung and not of branchiogenic origin. Dr. A. L. Gordon has reported an unusual case of Friedländer's bacillus septicaemia with involvement of the lung, liver, and urinary tract. Fatal anuria due to plugging of the ureters by deposits of sulphapyridine crystals was the subject of a paper by Dr. S. Hanson. The harmful effects of high voltage radiation on the intestinal tract have been described by Dr. R. M. Taylor. A case of multiple adenomata of the islet cells of the pancreas with fatal hypoglycaemia, the symptoms of which were unrelieved by the administration of glucose, was the subject of a report by Dr. A. J. Kerwin. The latter has also prepared an analysis of five cases of pulmonocardiac failure due to extreme deformities of the spinal column. Dr. William Boyd is studying the juxtaglomerular apparatus in a variety of animals, with special reference to changes in this structure in cases of arterial hypertension in man. He is also analysing the renal lesions of chronic and healed pyelonephritis, comparing cases in which there was hypertension with other cases in which the blood pressure was normal.

Dr. R. M. Price's systematic study of juvenile cases of tuberculosis shows that there is an appreciable diminution in the incidence of bovine infection which she attributes to the adoption of compulsory pasteurization of milk in this province. She is also investigating a number of chromogenic strains of acid-fast bacilli isolated from various human sources to determine if possible their relationship to the avian type of the tubercle bacillus. Through the courtesy of Dr. D. A. Irwin of the Department of Medical Research she has obtained, and is studying in detail, a strain of the vole bacillus, an acid-fast bacillus recently isolated in England, and which has given some promising results as an immunizing agent.

The search for chemotherapeutic compounds possessing special activity against the staphylococcus has been continued by Dr. P. H. Greey throughout the year. Over one hundred compounds have been investigated without finding one superior to sulphathiazole. Some of the compounds were synthesized in the Biochemical Division of the Department of Medical Research under the direction of Dr. C. C. Lucas, while the others were prepared by Parke Davis and Company. This investigation again has been aided by a generous donation from this company.

The chemotherapy of experimental gas gangrene infections in animals has been studied by Dr. P. H. Greey and Dr. R. A. Cleghorn of the Department of Medicine. It has been found that sulphonamide drugs, administered either by mouth or intravenously have very little effect on experimental *Cl. Welchii* infections. On the other hand the implantation of the compounds into the lesions has resulted in complete control of the infection. This work was aided by a grant from the National Research Council.

In the division of Surgical Pathology a new device has been developed on the principle of the dental drill for marking glass slides. Work previously reported on gastric and duodenal ulcers is being continued, each ulcer being carefully plotted in its relation to the fundo-pyloric line. A method for differentiating in the gross the acid and alkaline portions of the stomach is being worked out. Dr. W. L. Robinson presented a study on dermatofibroma of the skin before the Ontario Association of Pathologists and Dr. J. P. Wyatt one on periarteritis nodosa. Dr. Robinson has also made a study of the histopathology of the prostate and Dr. Wyatt an investigation into foreign body reactions.

The division of Neuropathology has been pleased to give laboratory space



and facilities to Squadron-Leader Murray L. Barr, R.C.A.F., who is engaged in an experimental research in collaboration with the Department of Medical Research. During the year the division has assisted the Department of Medical Research in several investigations.

Dr. M. A. Ogryzlo has collaborated with Dr. W. L. Donohue of the Hospital for Sick Children in the collection of a series of cases of hydrocephalus and is preparing a paper demonstrating the importance of the Arnold-Chiari deformity of the brain-stem in relation to hydrocephalus. Pathological material from the files of this division has been used by Dr. J. C. Richardson in an important contribution which he and Dr. H. H. Hyland have recently published on the subject of intracranial aneurysms. Dr. Richardson and Dr. A. W. Bagnall have published a report on recurrent subarachnoid haemorrhage from an angioma of the cerebellum, a study undertaken when Dr. Bagnall was a member of this Department. Dr. Robinson and Dr. Linell have completed an investigation of the relation of head injuries to meningitis which will be published shortly.

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#### PHARMACY AND PHARMACOLOGY

*Under the direction of Professor V. E. Henderson*

The teaching this year went forward more successfully than usual until Professor J. K. W. Ferguson entered the R.C.A.F. Medical Flying Service. This left the Department short-handed, but on the whole the work went well.

#### RESEARCHES

Research work has progressed satisfactorily, but somewhat slowly, and Dr. Ferguson's absence has delayed the publication of several studies.

Professor Lucas has refined the methods for the isolation and identification of coramine and a paper dealing with this work has gone to press. He has also made substantial progress with the methods for the isolation and identification of minute amounts of strychnine, such as occur in homicidal cases. Dr. Lucas contributed the necessary analytical work to a further study of ethyl propyl ether by Dr. W. E. Brown.



Professor Ferguson's study of the reflexes occurring during parturition has led to his publishing a brilliant piece of work of great importance. This work has been strengthened and amplified by the work of Dr. Bonnycastle on isolated uterine strips from the pregnant and non-pregnant rabbit. This forms the material for a paper by these two authors, as mentioned in the list of published papers.

Dr. Bonnycastle has nearly completed his series of observations upon blood plasma and interstitial fluid volumes under various anaesthetics, while Dr. C. S. Dafoe, working under a grant from the National Research Council to Professor Lucas, has completed a series of observations on the effect of various anaesthetics in shock, which shows clearly that ether is more dangerous than the other available agents.

Dr. A. Rytel, working under a grant from the National Research Council to Professor Ferguson, had completed a part of a series of studies on the effect of various digitalis glucosides when he left to join the Polish Army. He has gathered some important information which will be reported to the Council and in due course amplified for publication.

Mrs. M. M. O. Sweeten, working under a grant from the E. B. Shuttleworth Company, has gathered, incidental to the technical work she has been doing, some information of value on the frog and cat methods of assay of Digitalis Lanata tinctures and glucosides. It is hoped that this work will contribute to a further study next year of the important problems of standardization.

The Head of the Department translated a small German book intended for the use of the Medical Officers of the German Flying Service, and saw it through the Press. It has proved very useful and has been widely sold in Canada, the U.S.A., and Great Britain. He has recently been engaged in writing a simpler explanation of the physiology of flying. He has also begun a series of experiments on the pharmacology of respiratory reflexes, which promises to be interesting.

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- and BLACK, E. C. "The transport of CO<sub>2</sub> in the blood of certain freshwater fishes" (*Biological Bulletin*, vol. LXXX, 1941, p. 139).
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- "The substances causing vasoconstriction" (*Anesthesiology*, vol. I, 1940, p. 323).
- LUCAS, G. H. W. and BROWN, W. E. "Further studies with ethyl normal propyl ether" (*Canadian Medical Association Journal*, vol. XLIII, 1940, p. 526).

#### PHYSIOLOGY

*Under the direction of Professor C. H. Best*

#### RESEARCHES

Several members of the staff of this Department have spent a considerable proportion of their time during the past year facilitating the development of the Canadian Project for the Preparation of Dried Human Serum. Dr. Best and Dr. Donald Y. Solandt have served on the Canadian Red Cross Society



committee which is charged with the enlistment of blood donors and the other activities associated with securing the blood donations. They have also had responsibility in the Connaught Laboratories, where all the Canadian serum is dried. Dr. E. Fidler, Dr. R. E. Haist, and some of the part-time members of the staff have worked in the Toronto blood donors' clinic.

Professor N. B. Taylor has undertaken work in collaboration with Dr. E. T. Waters, to explore the possibilities of a 7 per cent solution of isinglass as a transfusion substitute in haemorrhage and shock. Experimental results suggest that this may prove a valuable substitute for blood in restoring the blood pressure in these conditions. A paper describing these experiments on laboratory animals has already been published.

The biophysical section, under the direction of Dr. Solandt, has been concerned particularly with problems arising out of the war. Mr. J. W. Dales has completed a study of the parameters of excitation for intact mammalian nerves and an important connection between calcium metabolism and excitation has been demonstrated. He is proceeding to a related study of the efficiency of excitation exhibited by currents of various wave-forms. This work has indicated the special efficacy of low frequency sinusoidal currents, a finding which has an important practical application to methods used in the physiotherapy of injured limbs. This work has been facilitated by micromanipulative equipment provided through the generosity of the American Philosophical Society of Philadelphia. Dr. J. W. Scott has continued his study on the acetylcholine sensitivity of muscles deprived of lower motor neurone control.

Collaborating with the Head of the Department, research work on some of the special physiological problems facing the Royal Canadian Navy and the Royal Canadian Air Force has been undertaken. A part of this work has already been completed and has yielded results of practical importance.

As mentioned elsewhere, Dr. Waters has collaborated with Drs. Taylor and Fidler in the experiments on blood substitutes. Dr. Waters has been responsible for the chemical aspects of this work. With Dr. Haist he has obtained some interesting preliminary results when concentrates of urine of depancreatized dogs have been injected into rats. These experiments may provide further information on the complex endocrine disturbance of diabetes. Dr. Margaret T. C. Mitford of the University of St. Andrews has been working with Dr. Waters on blood coagulation changes in anaphylactic shock.

Dr. Haist and his group have attacked the problem of the delayed shock which sometimes follows the release of pressure on animal tissues.

Dr. Fidler has collaborated with Dr. Waters in experiments bearing on the origin of blood platelets. Their report was published this year. In observations in heart-lung preparations no satisfactory evidence was obtained of platelet production in the lungs, and the question arose whether certain special factors may influence this production. Further work on platelets in anaphylaxis is under review. Still other work upon platelets is being done in connection with the possible use of isinglass in haemorrhage. In collaboration with Miss Dale, experiments have been conducted upon the occurrence of haemorrhagic kidneys resulting from choline-deficient diets. Up to the present, results obtained are confirmatory of other work in this field.

The study of the relation of the anterior pituitary gland to metabolism has been continued by Dr. J. Campbell. In collaboration with the Head of the Department and with Dr. Ham and Dr. Haist, the effect of different diets and of fasting on the transient diabetes produced in dogs by the administration of anterior pituitary extracts was determined. A test has been developed for diabetogenic potency, using normal dogs which have been proved sensitive to the diabetogenic extract. Using this test the fractionation studies of the extracts have been continued. Mr. D. F. Pen and Dr. Campbell have developed convenient quantitative tests for toxic material in the tissues of shocked animals. The extracts of the tissues of normal and shocked animals exhibited essentially



the same toxicity. The ash of the extracts was highly toxic. Dr. Jeanne Manery Fisher of the Department of Biochemistry kindly offered to determine the potassium of the ash, and it was estimated that at least 70 per cent of the potassium of the muscle had been extracted by the procedures used. The injection of equivalent amounts of potassium chloride produced similar toxic effects. The potassium content of the blood of the test mice was increased greatly, and to the same extent, by the muscle ash and by equivalent amounts of potassium chloride. Potassium is without doubt the chief toxic factor in the muscle extracts under the conditions of these tests.

Dr. L. B. Jaques has been engaged in the development of a method of preparation of thrombin. The past year has been spent in overcoming the technical difficulties involved in the preparation of prothrombin, and a simple method of preparation of this substance has been developed which yields an active thrombin (25-250 units/mg.) in high yield (70-100 per cent). A new method for the assay of prothrombin has been developed. The method is based on the use of citrated horse plasma and logarithmic scales, and has proved extremely valuable in the preparation of the material. In last year's report mention was made of the finding that dog heparin appeared to be different from that obtained from beef tissue. This finding has been extended by isolating heparin as the crystalline barium salt from four species (dog, ox, pig, and sheep) and it has been shown that while these have the same fundamental chemical composition, they show marked differences in biological activity, their relative anticoagulant activity being 10:4:2:1.

Considerable time has been spent this winter and spring in collaboration with Dr. A. F. Charles of the Connaught Laboratories in developing a colorimetric method for the determination of heparin. The method is based on the use of the dye, toluidine blue, and conditions necessary for accurate assays have been determined. It is expected that this will make progress possible in the study of heparinase and also in various problems on the physiology of heparin which involve the frequent determination of heparin in blood.

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- and SOLANDT, D. Y. "Studies in experimental shock" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 206-9).
- "Studies on the etiology of traumatic shock" (*American Journal of Physiology*, vol. CXXXIII, 1941, p. 213).
- "Use of plasma or serum as a substitute for whole blood" (*British Medical Journal*, vol. I, 1940, pp. 116-17).
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- FIDLAR, E. and WATERS, E. T. "The origin of platelets; their behavior in the heart-lung preparation" (*Journal of Experimental Medicine*, vol. LXXIII, 1941, p. 299).
- HAIST, R. E., CAMPBELL, J., and BEST, C. H. "The prevention of diabetes" (*New England Journal of Medicine*, vol. CCXXIII, 1940, pp. 607-15).
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- and CHARLES, A. F. "The assay of heparin" (*Quarterly Journal of Pharmacy and Pharmacology*, vol. XIV, 1941, pp. 1-15).
- MAGLADERY, J. W., SOLANDT, D. Y., and BEST, C. H. "Serum and plasma in treatment of haemorrhage in experimental animals" (*British Medical Journal*, vol. II, 1940, pp. 248-50).
- MANERY, J. F. and SOLANDT, D. Y. "Electrolyte changes in traumatic shock" (*American Journal of Physiology*, vol. CXXXIII, 1941, p. 376).
- SOLANDT, D. Y. "Denervated skeletal muscle" (*Journal of the Canadian Physiotherapy Association*, vol. I, 1940, pp. 1-3).
- and MAGLADERY, J. W. "A comparison of the effects of upper and lower motor neurone lesions on skeletal muscle" (*American Journal of Physiology*, vol. CXXXIII, 1941, p. 456).
- TAYLOR, N. B. "The applied physiology of the kidney" (*Bulletin of the Academy of Medicine*, Toronto, vol. XIV, 1941, p. 133).
- and WATERS, E. T. "The use of isinglass as a transfusion fluid in haemorrhage and shock" (*Canadian Medical Association Journal*, vol. XLIV, 1941, p. 547).
- WATERS, E. T. "Immunology of serum" (*University of Toronto Medical Journal*, vol. XVIII, 1941, p. 169).
- and MARKOWITZ, J. "Typical anaphylaxis in the dog in the absence of the liver" (*American Journal of Physiology*, vol. CXXX, 1940, p. 379).

## PSYCHIATRY

*Under the direction of Professor C. B. Farrar*

Undergraduate instruction in both the regular and elective courses follows essentially the plan outlined last year.

In the graduate course seven physicians from the Ontario Hospital Service enrolled at the beginning of the year. In addition Dr. L. D. Proctor of the Psychiatric Hospital staff and Research Fellow in Psychiatry, was authorized by the Council to take the final examinations in the graduate course. All these candidates succeeded and were recommended for the diploma in Psychiatry. Dr. E. S. Goddard having the highest standing was awarded the Faulkner medal.

During the year it became necessary for Dr. N. L. Easton, who was in charge of the clinic in the research division, to take over the insulin unit at the Ontario Hospital, New Toronto. Dr. B. H. McNeel was appointed to take over this work in the research division at the Psychiatric Hospital. Dr. G. H. Lugsdin assumed duties at the Psychiatric Hospital as Demonstrator. Doctors C. G. Stogdill, J. E. Sharpe, and K. G. Gray are on leave of absence for the duration of the war.

## RESEARCHES

Research work carried on jointly with the Department of Medical Research under a Rockefeller Grant was continued during the year. In some of the cases of schizophrenia studied, there are suggestive indications of abnormalities of metabolism. Such cases when responding favourably under insulin therapy have been found to show improvement in the metabolism, and a corresponding improvement in certain clinical and psychological features. There are also brain potential changes as seen in the electroencephalogram that appear to parallel the clinical course.

During the past two years efforts have been directed to the development of a quantitative method of assessing the degree of psychosis during the course of illness in order to provide a more satisfactory method of comparing clinical with other findings. An attempt has also been made to standardize a method of measuring the degree of intellectual dysfunction to make possible a further quantitative index of improvement under treatment. These findings require further working over.



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- FARRAR, C. B. "Psychiatry" (in *New international year book*, 1940, New York, Funk and Wagnalls).
- PROCTOR, L. D. (with FRANKS, W. R.) "Comparative observations on the methylglucose activity of the blood in mentally normal and mentally ill individuals" (*American Journal of Psychiatry*, vol. XCVII, May, 1941).
- STOGDILL, C. B. (with AMOS, H. E.) *Canadian intelligence examination* (Toronto, Ryerson, 1940).

## RADIOLOGY

*Under the direction of Professor G. E. Richards*

Owing to a lack of medical radiologists and technicians for military hospitals, the Department was asked to organize suitable courses of training and this has been one of the chief activities during the year. Two classes of technicians numbering forty-five and one class of twelve medical radiologists have been conducted. It has been realized that the time allotted for this purpose was too short for the training given to be entirely adequate but every effort was made to provide a systematic grounding in all the fundamentals, and following these classes arrangements have been made for further practical experience. This work was carried on in addition to the regular classes to undergraduate students which have been conducted with little change from previous years.

Technical developments which have taken place during the past few years include one very interesting device which has now reached a practical stage. This is a device which makes possible the selection of any given level or layer for radiographic study and hence has been called "Laminography" or "Body-section" Radiography. This method has many obvious applications and will probably prove to be one of the greatest advances in radiology for many years.

No staff changes have occurred during the year.

## SURGERY

*Under the direction of Professor W. E. Gallie*

A review of the year's work brings to notice the gratifying fact that in spite of the heavy drain on the staff caused by the call of the army, it has been possible, by rearrangement of work and by the recall to duty of retired members, to carry on the clinical and didactic teaching of Surgery as in former years. In this relationship the head of the Department is indebted to Dr. Wallace Scott and Dr. Malcolm Cameron who have returned to active teaching at St. Michael's Hospital and to Dr. E. S. Ryerson who has continued clinical instruction at the General.

The only change in the character of the teaching introduced this year was the marked broadening of the course on First Aid and Fractures. This was done both because of the nature of the times and because it has been felt that our teaching could be strengthened in these directions. Both by didactic and clinical instruction, therefore, emphasis has been placed on these subjects.

The most important change in organization during the year has been the establishment of clinical instruction in Urology at the Toronto Western Hospital. The head of the Sub-Department of Urology there, Dr. N. W. Roome, has been appointed a Senior Demonstrator of Surgery and will take charge of the teaching of Urology to students of the fifth and sixth years. This change rounds out the teaching arrangements at the Western so that they conform to those at the General and St. Michael's.



At the General Hospital a change has been made which will probably have considerable effect on the teaching of Surgery, in the establishment of a definite plan of "follow up" study of the results of treatment. This change has been made possible by the initiative and enthusiasm of Dr. Chas. B. Parker who has been placed in charge of the experiment. Doctor Parker first visited the principal clinics of the Eastern United States and then drew up the present plan and placed it in operation. According to it the patients in hospital, either through the students or the nurses in charge of them, are made familiar with the idea that their doctors will be interested in the ultimate outcome of their treatment and will, therefore, recall them at intervals for examination. At intervals after their discharge these patients are recalled to a special follow up clinic where the surgeon who operated and the students will see them and record the findings on the history. In this way, both students and teachers will acquire a more accurate knowledge of the results of treatment and the records will be made infinitely more valuable to those who wish to make use of them for the more exhaustive study of groups of cases.

Owing to the need of the army for young graduates in Medicine, it has been necessary to abandon temporarily the planned course of training for surgeons which has been in operation for the past few years. This course involved from three to five years of training subsequent to an ordinary rotating intern year and it was designed to turn out thoroughly qualified surgeons. As these young men are needed in the army immediately after their rotating internship it has become impossible to hold them longer than one year. The vacancies will be filled by applicants who, for one reason or another, are not qualified for army service. For those who have enlisted during the term of their surgical training it is the intention of the Department to extend an opportunity whenever possible after the war to complete that training.

The army continues to make serious inroads on the staff. To the long list reported last year who are serving with No. 15 General Hospital, No. 1 Neurological Hospital, the Toronto Military Hospital, and at Camp Borden, must be added Major Jas. W. Ross of St. Michael's Hospital, Lieut. Hugh Norman of the Western, and Captain J. R. F. Mills of the General. From among the Fellows have gone Lieut. E. B. Tovee, Lieut. F. B. Thomson, Lieut. W. R. Dalziel, Lieut. H. V. Slemon, and Surgeon-Lieut. J. deL. Bourgeois. At the moment there is in course of organization an orthopaedic unit for service with the Emergency Medical Service in Scotland. This will take three more surgeons from our staff and a group of surgical interns.

From time to time reports have come from our colleagues overseas recording the establishment of a medical society for the interchange of ideas, and describing their keen interest in the new methods of dealing with wounds. Lieut.-Colonel J. A. MacFarlane and Major R. M. Wansbrough are evidently busy with active surgery and consulting work. Major Botterell has had experience in the treatment of head injuries in the air raids on Manchester, and Captain S. D. Gordon has had plenty of opportunity to use his skill in plastic surgery. All our men can be counted on to give superb service to the army.

The annual post-graduate course in Surgery given in October was concerned this year with "Trauma." The students, influenced undoubtedly by the war, were enthusiastic in their search for all that is new in this type of Surgery and expressed themselves as pleased with the course. This coming year the course will be on fractures.

Honours have come during this year to Dr. R. R. Graham, Dr. E. S. Ryerson, Dr. H. W. Wookey, and the Head of the Department. Doctor Graham was elected President of the Interstate Post-Graduate Medical Association. Doctor Ryerson was elected President of the Medical Council of Canada. Doctor Wookey was elected to fellowship in the American Surgical Association. The Head of the Department was elected President of the American College of Surgeons.



Staff changes, because of the absence of so many members with the armed forces, were kept at a minimum. They included promotions for Dr. Chas. B. Parker, Dr. R. J. A. McComb, and Dr. R. H. Thomas from Senior Demonstrators to Associates in Surgery; for Dr. J. A. MacFarlane and Dr. J. H. Couch from Junior to Senior Demonstrator. The new appointments were Dr. Jessie Gray as Fellow in Surgery, "part-time," and Dr. A. D. McLachlin, Dr. C. W. M. Service, and Dr. W. L. M. King as Fellows in Surgery, Resident.

### RESEARCHES

Owing to the depletion of the staff because of the war the amount of research in the Department is naturally curtailed. Dr. Gordon Murray, however, in what time is left to him, has continued his investigation of the uses to which heparin can be put in enlarging the field of application of surgery in the blood-vessels. Dr. H. F. Robertson, with advice from Professor V. E. Henderson, has continued his search for ways of lessening the damage to the heart resulting from coronary occlusion, and Dr. F. R. Wilkinson has continued his studies of the effect of sulphathiazole in osteomyelitis and staphylococcus septicaemia. Dr. D. R. Mitchell has continued a study of the effects of sodium sulphathiazole in the treatment of acute pyelitis and cystitis and of gonorrhoeal arthritis.

The outstanding clinical study of the year was that of Dr. C. B. Parker who demonstrated from a review of all the cases of carcinoma of the colon seen at the General Hospital during a ten-year period, the importance and value of the "follow up" clinic. So convincing was his demonstration that the "follow up" has been established as part of the departmental system.

### PUBLICATIONS

- COUCH, J. H. *Emergencies in war* (Toronto, Canadian Red Cross Society, 1941).
- "First aid and transportation of fractures" (*Manitoba Medical Review*, vol. XX, pp. 200-3).
- "Glomus tumours: clinical aspect and physiology" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 356-7).
- "Hyperparathyroidism: two case reports" (*Bulletin of the Academy of Medicine*, Toronto, vol. XIV, 1940, pp. 7-10).
- "Local anaesthesia in reduction of fractures" (*University of Toronto Medical Journal*, vol. XVIII, 1940, pp. 59-61).
- "Two fractures of the neck of femur" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 31-4).
- FOULDS, G. S. "Diagnosis and treatment of pyelonephritis" (*Bulletin of the Academy of Medicine*, Toronto, vol. XIV, no. 8).
- "Rational treatment of ureteral stone" (*Surgery, Gynaecology, and Obstetrics*, vol. LXXI, pp. 110-111).
- GALLIE, W. E. "The experience of the Canadian Army and Pensions Board with amputations of the lower extremity" (*Annals of Surgery*, vol. CXIII, June, 1941).
- "War wounds" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 338-44).
- GRAHAM, R. R. "A technique for total gastrectomy" (*Surgery*, Aug., 1940).
- HARRIS, R. I. "The role of physiotherapy in the after care of arthroplasty of the hip with vitallium cup" (*Journal of the Canadian Physiotherapy Association*, Dec., 1940).
- and COULTHARD, H. S. "End results of treatment of Pott's disease" (*Journal of Bone and Joint Surgery*, July, 1940).
- JANES, R. M. "The treatment of tumours of the salivary glands by radical excision" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 554-9).
- LAIRD, R. C. "Complete rupture of the supraspinatus tendon" (*Bulletin of the Academy of Medicine*, Toronto, vol. XIV, no. 5).



- LEMESURIER, A. B. "The treatment of fractures of the shaft of the femur in children" (*American Journal of Surgery*, July, 1940).
- "The treatment of muscle paralysis in poliomyelitis" (*University of Toronto Medical Journal*, vol. XVIII, 1941, pp. 163-8).
- MACFARLANE, J. A. "Cancer of the rectum" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 467-9).
- "Multiple emboli treated surgically" (*British Medical Journal*, vol. I, 1940, p. 971).
- "The trend in military surgery in the first year of the War" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 540-3).
- MITCHELL, D. R. and COTE, F. H. "Sodium sulfathiazole in urology" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 240-4).
- GREIG, C. H., and UREN, J. L. "Sulfathiazole therapy of gonorrhoea" (*Canadian Medical Association Journal*, vol. XLIV, 1941, pp. 237-40).
- "The treatment of gonorrhoea by chemotherapy" (*Canadian Medical Association Journal*, vol. XLII, 1940, pp. 533-4).
- MURRAY, D. W. G. "Fixation of dislocations of the acromio-clavicular joint and rupture of coraco-clavicular ligaments" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 270-1).
- "Heparin in thrombosis and blood vessel surgery" (*Surgery, Gynaecology and Obstetrics*, vol. LXXII, 1941, pp. 340-4).
- "A method of fixation for fracture of the clavicle" (*Journal of Bone and Joint Surgery*, vol. XXII, no. 3, 1940, pp. 616-20).
- PEARSE, R. and McCOMB, R. A. "The treatment of infiltrating tumours of the bladder" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 106-10).
- RYERSON, E. S. "Physical activity and fatigue in relation to health: the value of physical education to nurses" (*Canadian Hospital*, May, 1941).
- WANSBROUGH, R. M. "Appendicitis" (*Canadian Medical Association Journal*, vol. XLIII, 1940, pp. 147-8).
- WILKINSON, F. R. "Acute haematogenous osteomyelitis in children" (*University of Toronto Medical Journal*, vol. XVIII, 1941, pp. 256-9).

## THERAPEUTICS

*Under the direction of Professor R. F. Farquharson*

The general plan of teaching has been continued as in previous years.

Drs. W. B. Charles, J. L. Fowler, and C. C. Gray, Senior Interns in Medicine at the Toronto General Hospital, were appointed Assistants in Therapeutics for the year.

## RESEARCHES

Dr. K. J. R. Wightman has worked with Dr. J. A. Dauphinee of the Department of Medicine in the continued investigation of the use of the sulphonamide series of drugs in respiratory and other infections.

Dr. A. H. Squires has continued the investigation of the effect of prolonged ingestion of thyroid substance by patients not suffering from hypothyroidism. A report of this work, indicating that the secretion of the patient's thyroid gland is inhibited by prolonged ingestion of thyroid substance, has been presented to the Association of American Physicians.

### Sub-Department of Anaesthesia

Teaching has been carried on as in previous years.

### Sub-Department of Physical Therapy

Teaching has been carried on as in previous years.



## PUBLICATIONS

- BALFOUR, G. R. "Anaesthesia" (*University of Toronto Medical Journal*, vol. XVIII, 1940, p. 62).  
GARDINER, W. J. "The use of physical therapy in the treatment of fractures" (*University of Toronto Medical Journal*, vol. XVIII, 1941, p. 217).  
WILKINS, A. R. "Nupercaine spinal anaesthesia in abdominal surgery" (*Canadian Medical Association Journal*, vol. XLIV, 1941, p. 342).

## MEDICAL RESEARCH

*Under the direction of the late Sir Frederick Banting*

During the academic year 1940-1 the Department of Medical Research suffered a grievous loss in the sudden death (February 21, 1941), while on active service, of the Head of the Department, Major Sir Frederick G. Banting. All the members of the Department, from those of professorial rank to the ones doing the most menial duties, have experienced a sense of personal bereavement, for Dr. Banting was looked upon more as a friend and counsellor than as a taskmaster. His personal charm and his enthusiasm for the work endeared him to all his staff and stimulated their scientific interest and endeavours. A leader has been described as a man with an objective outside himself, which is bigger than he thinks he is; Dr. Banting, with his genuine modesty, although he contributed valuable ideas and freely gave encouragement and advice, always desired to be considered as merely one of the workers in the team and in that way revealed himself to his associates as a great leader. Letters received from former workers in the Department have all expressed the same admiration for his type of leadership and the same sense of personal loss. While the whole scientific world has mourned the death of Dr. Banting, those who were most intimately connected with him have experienced the greatest sense of loss and find it most difficult to express their feelings. The memory of his enthusiastic interest in the problems of individuals in the Department and of his unselfish efforts to facilitate their work will remain in the minds of all his staff and will encourage and guide them in the future.

The catastrophe of Dr. Banting's death has been doubly serious to the Department as two of the senior members (Dr. G. E. Hall and Dr. W. R. Franks) are away, also on active service. Seven other members of the Department are on active service and one chemist has been requisitioned for a post in a munitions plant. Dr. H. C. Bazett, Professor of Physiology at the University of Pennsylvania, who had about that time been working in the Department for several months, was brought back by the University to direct National Research Council projects connected with Aviation Medicine under investigation in the Department of Medical Research.

Most of the efforts of the Department during the year were devoted to the solution of problems arising in the R.C.A.F. due to the greater accelerations and higher altitudes at which modern aircraft operate. This work was largely supported by special grants from the National Research Council through its Associate Committee on Aviation Medical Research, of which the late Sir Frederick Banting was Chairman. Those so engaged included Drs. H. C. Bazett, E. C. Black, A. C. Burton, J. A. Kitching, J. B. Bateman, H. G. Armstrong, Mr. John Goodwin, G. A. Meek, G. J. Millar, S. Smith, Miss J. Lang, Miss M. Shaw, Miss H. Brock, and Miss E. White. Other members of the Department have devoted part time to the same group of problems. Some work on medical aspects of chemical warfare was also done under National Research Council sponsorship. This investigation was conducted by Dr. C. C. Lucas and Dr. D. A. Irwin, with the part-time collaboration of Dr. H. M. Macrae (Department of Ophthalmology) and Dr. N. M. Wrong (Department of Medicine). Technical assistance for this problem has been obtained from Mr. A. Loughheed and Mr. C. Cassie and part time from Mr. A. Arcari and Miss M. Wheatley. Dr. J. M. R. Beveridge has devoted the latter half of the academic year to one phase of this investigation.



The work on chemotherapy under Dr. C. C. Lucas has been continued, although on a somewhat smaller scale than last year. Through the continued co-operation of Dr. P. H. Greey of the Department of Pathology and Bacteriology, the new compounds made in this laboratory have been examined for chemotherapeutic activity. The drugs have been tested upon mice experimentally infected with streptococci, pneumococci, or staphylococci.

Mr. C. Marchant has prepared representative members of two series of benzimidazole compounds (benzimidazolones and benzimidazolthiones) containing a sulphonamide group or linkage. Dr. S. F. MacDonald, before he left in December, 1940, had added to the series of sulphonamides of the types described in this report last year and these new compounds have been tested for activity. Dr. C. von Seemann has prepared 1-amino-naphthalene-5-sulphonamide and sulphonamides derived from  $\alpha$ -acetylaminothiophene. He has also prepared a series of dyes by coupling diazotized aromatic amines with  $\alpha$ -acetylaminothiophene. Dr. von Seemann has also made sulphonamides derived from benzothiazole.

Dr. J. M. R. Beveridge continued his studies of methods for separating amino acids from protein hydrolysates until the pressure of war work in the Department necessitated a change in his problem. For some months he was engaged in a study of the blood esterases of animals subjected to acute and chronic anoxia in the decompression chamber. Recently he has been engaged in a biochemical study of animals exposed to vesicant war gases.

Mr. N. R. Stephenson was assigned the problem of purifying histaminase to a high degree of activity since the proposal had been made that injections of the purified enzyme might be of therapeutic value in the treatment of shock. He has obtained preparations with high activity which are stable in solution for at least a week at 5°C. No adverse physiological effects were noted in normal animals following injection of massive doses of the purified enzyme nor were any beneficial effects observed when it was injected into histamine-shocked animals. Mr. Stephenson has studied the action of the purified enzyme on histamine in a Warburg apparatus.

Mr. C. McArthur, working under a Macy Fellowship, has continued his studies of the chemical composition of the lipid material in atheromatous plaques derived from human autopsy material. He has been particularly concerned with the unsaturated fatty acids of the glycerides and the sterol esters.

Dr. J. G. Dewan and Miss E. Melrose have continued the biochemical work on patients with schizophrenia in collaboration with the Toronto Psychiatric Hospital, under a grant from the Rockefeller Foundation. This investigation covers one phase of a collaborative study of these patients commenced several years ago under the direction of Dr. G. E. Hall and Professor C. B. Farrar. Mr. Gordon Parkes, who has been paid from the same grant, has been taking electroencephalographic records on these patients under the supervision of Mr. J. E. Goodwin. Mr. John Goodwin and Miss Helen Brock have continued to study the records so obtained.

Dr. D. A. Irwin and Mr. F. E. Chase continued their co-operation with the Mining group by studying the effect of aluminum powder on the growth of the tubercle bacillus in vitro. The organisms that failed to grow in media containing aluminum powder were shown to be non-viable when injected into guinea-pigs. Dr. Irwin and Mr. Chase are testing a chemical derivative of the tubercle bacillus protein (which had been prepared by Dr. Franks and Miss E. Grant) for its activity in developing immunity in guinea-pigs.

Dr. Bruno Mendel, with Miss Dorothy Mundell (Banting Research Foundation Fellow) and Miss F. Strelitz continued their work on cholinesterase. Highly purified preparations were obtained from pancreas and serum. The pancreas esterase was separated from its colloidal protein carrier, which could be replaced by various unspecific organic and even inorganic colloids.

Dr. Mendel and Miss Strelitz started work on an enzyme which catalyses



the reaction between thiosulphate and hydrocyanic acid leading to the formation of thiocyanate. Attempts were made to purify this enzyme and its properties and kinetics were studied.

The work done in the Department has been assisted during the year by grants from the following: National Research Council; Banting Research Foundation; Josiah Macy Jr. Foundation, New York; Rockefeller Foundation, New York; Ontario Mining Association. The Department wishes to express their thanks for this financial assistance.

The Department of Medical Research has enjoyed the privilege of receiving co-operation from many other Departments of the University and wishes to express appreciation for the facilities and help which have aided the work of the Department.

The Superintendent and Bursar and their staffs have rendered invaluable assistance to the Department of Medical Research throughout the year. The heavy burdens arising from the war research activities and the extra difficulties occasioned by Dr. Banting's untimely death have been cheerfully shared by them. For their wholehearted support the Department wishes to express a deep sense of gratitude.

#### PUBLICATIONS

BEVERIDGE, J. M. R. and LUCAS, C. C. "A note on serum cholinesterase variability in male and female rats" (*Science*, vol. XCIII, 1941, pp. 356-7).

LUCAS, C. C. "Chemical warfare" (*Canadian Journal of Medical Technology*, vol. III, no. 1, Dec., 1940).

————— and BEVERIDGE, J. M. R. "The analysis of hair keratin. I. A method for the quantitative removal of cystine from keratin hydrolysates" (*Biochemical Journal*, vol. XXXIV, 1940, pp. 1356-66).

McEACHERN, C. G., SMITH, F. H., and MANNING, G. W. "The effect of intravenous injection of papaverine hydrochloride upon the mortality resulting from sudden occlusion of coronary arteries in dogs" (*American Heart Journal*, vol. XXI, 1941, pp. 25-30).

RUDNEY, H. "The utilization of 1-glucose by mammalian tissues and bacteria" (*Science*, vol. XCII, 1940, pp. 112-13).

SMITH, F. H., McEACHERN, C. G., and HALL, G. E. "The effect of the intravenous administration of quinidine sulfate on the development of ventricular fibrillation following sudden occlusion of the circumflex branch of the left coronary artery" (*American Heart Journal*, vol. XX, 1940, pp. 620-6).

TOWNSEND, G. F. and LUCAS, C. C. "Chemical examination of the lipid fraction of Royal jelly" (*Science*, vol. XCII, 1940, p. 43).

————— "The chemical nature of Royal jelly" (*Biochemical Journal*, vol. XXXIV, 1940, pp. 1155-62).

#### ART SERVICE

*Under the direction of Miss Maria T. Wishart*

The past year can be reviewed with satisfaction for not only has a greater amount of work been accomplished than in any previous year but the illustrations almost without exception were made immediate use of either for publication, to illustrate lectures or to incorporate in text-books, rather than set aside as records for possible future use. In these days, with the undeniable feeling in the air that work should be undertaken for a concrete purpose, this is most satisfactory.

We are constantly being asked if the camera is not superseding medical illustrating. Definitely no. Equally emphatically it is changing the type and style of work required of us. From the list of techniques used it can be seen that three-quarters of the work is executed in pen and ink line drawings. The



technique lends itself to clear, concise diagrams whereby the subject may be rendered distinctly to the onlooker. Such clear delineation of a subject, detailing only the area required, is something the camera cannot do.

Illustrations from the Department have been used during this past year at the Ontario Medical Association meeting in Windsor, the Canadian Medical Association meeting in Winnipeg, the American Orthopaedic Association in Toronto, the meeting of the American Association for Thoracic Surgery, on the Canadian Medical Association tour of the West last September, and the meeting of the Registered Nurses Convention of Ontario at Niagara Falls, etc. They have been published or are about to be published in the *Canadian Medical Association Journal*, the *Journal of Bone and Joint Surgery*, the *British Journal of Surgery*, *Appleton's System of Operative Surgery*, *Journal of Thoracic Surgery*, the *Year Book*, "Harvey Lecture," *American Journal of Physiology*, revised editions of Dr. Wm. Boyd's *Surgical Pathology* and *Introduction to Medical Science*, etc.

The extent of the variation of the work undertaken and the use to which it has been put is best shown in the following selected instances:

Pen and ink diagrams were made for Dr. P. B. Hamilton and Mr. B. E. Crocker of the Department of Biochemistry illustrating technical points in apparatus used in a study on digestion in the dog. The article is to be published shortly in the *American Journal of Physiology*.

Illustrations on obstetrical and gynaecological subjects are being made from time to time and collected for a text-book which Dr. Wm. Scott and Dr. H. B. VanWyck are preparing. The work is most interesting and a publication of this kind affords more scope for a broader development of techniques.

Dr. R. M. Janes is again making use of the illustrations which Miss Hopper did for him showing removal of a tumour of the parotid gland. The *Year Book* Publishers have requested permission to incorporate his article on the salivary glands in their next issue.

Further illustrations have been added to the large wall chart on "extrusion of the intervertebral discs involving L5 and S1." The chart was used both at the recent meeting of the American Orthopaedic Association held in Toronto, June, 1941, and at the meeting of the Registered Nurses' Convention of Ontario held at Niagara, April, 1941. A picture of the same has been prepared for publication.

Some interesting studies were made at the clinic of the Hospital for Sick Children where Dr. S. A. Thompson demonstrated his method of treatment of club feet by the use of Denis-Browne splints. These illustrations were used at the American Orthopaedic Association meeting held in Toronto, June, 1941, and are to be published shortly in the *Journal of Bone and Joint Surgery*.

Further pen and ink illustrations of an oesophagectomy were made for Dr. H. W. Wookey which he used for lantern slides on the western tour arranged by the Canadian Medical Association, September, 1940.

First and second steps of "Plastic Repair of a Hypospadias" were illustrated in pen and ink for Dr. A. W. Farmer. This work was especially satisfactory to undertake for Dr. Farmer was most considerate in demonstrating the various steps slowly and clearly from start to finish.

Pen and ink, and water-colour diagrams of types of bacteria were executed for Dr. Wm. Boyd, Department of Pathology, for his revised edition of *Introduction to Medical Science* now being published. Also coloured microscopic drawings were made of fatty degeneration of the heart, gastric ulcer, and psittacosis bodies. These are for use in the pathological museum.

A pen and ink diagram was drawn to illustrate the paper Dr. Norman Shenstone gave on "Experiences in Total Pneumonectomy" at the meeting of the American Association for Thoracic Surgery held in Toronto, June, 1941.

Pen and ink illustrations were made for Dr. A. Lloyd Morgan showing



“Shortening of the Muscle of the Eye” and “Plastic Repair Deformities of the Eyelid.” The latter were published in the *Canadian Medical Association Journal*, June, 1941.

Illustrations made for Dr. Roscoe Graham to illustrate the paper he gave at the Ontario Medical Association, May, 1941, on “The Pathology and Treatment of Massive Rectal Prolapse” were not easy to execute as attendance at the operation was only requested when the operation was in its final stages. The subject is difficult enough to visualize fully even if seen step by step.

An interesting case showing the removal of an osteochondroma of the first rib without trauma to adjacent parts involved, was sketched in the operating-room for Dr. R. M. Janes. These were simple diagramatic pen and ink illustrations.

Each year a limited amount of colour work is asked for. Prohibitive reproduction charges have always resulted in these illustrations being of use only as records. It has, consequently, been both a privilege and a pleasure to prepare colour drawings for use in Dr. Wm. Boyd’s forthcoming revised edition of *Text-book on Surgical Pathology*. It will be the first time that any colour work from this Department has been reproduced and it is gratifying to think that it is for such an important purpose that Miss Hopper has prepared these excellent illustrations.

Summary of Work of Art Service:

1. According to medium of work:	
1. Water-colour.....	16
2. Half-tone.....	9
3. Pen and ink.....	109
4. Pencil drawings.....	2
5. Sketches.....	12
	—
Total.....	148
2. According to departments:	
1. Biochemistry.....	3
2. Neuro-Surgery.....	10
3. Obstetrics and Gynaecology.....	22
4. Ophthalmology.....	15
5. Pathology.....	29
6. Pathology H.S.C.....	3
7. Physiological Hygiene.....	2
8. Surgery.....	30
9. Surgery H.S.C.....	33
10. Medical Research.....	1
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Total.....	148
3. Number of members of Faculty for whom work was done.....	17

MEDICAL SOCIETY

<i>Honorary President</i> .....	Dean W. E. Gallie
<i>Honorary Secretary-Treasurer</i> .....	Dr. F. I. Lewis
<i>President</i> .....	W. E. Ortved
<i>Vice-President</i> .....	G. A. Gould
<i>Secretary-Treasurer</i> .....	J. B. Armstrong
<i>Assistant Secretary-Treasurer</i> .....	W. G. Burrows



The Medical Society is the organization of the undergraduate student body, in the Faculty of Medicine. The executive is elected each spring to administer the business of the Society throughout the following academic year. The activities of the Medical Society may be divided into certain definite spheres each directed by a special committee.

The Soph-Frosh Committee, under the able chairmanship of "Gord" Beattie, initiated the first year and was in charge of the Soph-Frosh dance, which was again informal, and was held at Hart House.

The Banquet Committee, with its excellent chairman, Grant Gould, inaugurated, at least in recent years, the Annual Medical Banquet. This Banquet served at least two purposes. Held in October, it brought together the whole fraternization; it also supplanted the former Soph-Frosh Banquet and, as such, officially welcomed the first year. The guest of honour and speaker of the evening was Brigadier Eric Haldenby, who recounted some of his experiences in England and on his short but hectic visit to France. The Banquet was indeed a success and well deserves to become an annual medical event.

The At-Home Committee, also under the distinguished chairmanship of Grant Gould, held the annual At-Home Banquet at the Royal York Hotel. Mart Kenney's orchestra was engaged and the affair was a great financial as well as entertaining success.

"Daffydil" was not held this year.

"Les" Mottram, in charge of Open Meetings, presented a very interesting programme. Four such meetings were held throughout the year. Dr. Harry Ebbs was the speaker at the first, and his subject, "10,000 Miles North of the Arctic Circle," was illustrated with coloured lantern slides and moving pictures. Dr. Ebbs recounted his experiences on a health survey of Canada's far north. At the second Dr. Harold De Will Ball was the speaker and his subject was "Medical Examination for Recruits of the Air Force." Dr. Ball pointed out many of the difficulties involved and explained the complicated categorical system employed by the Air Force. The speaker on the third occasion was Dr. J. A. Hannah and his address was entitled "Health Insurance." Dr. Hannah outlined the history and development of the Associated Medical Services, Inc., and stressed the advantages of such a system to the public and to the medical profession. The speaker at the final open meeting was Dr. T. C. Routley and his subject was "Organized Medicine in Canada." Dr. Routley outlined the purpose and achievements of the Canadian Medical Association. These meetings were well attended and at each refreshments were served.

The *Medical Journal*, under the very able editorship of Tom Wilson, enjoyed a successful year. The Medical Society gave \$25 to the Auxiliary Services for the comfort of the staff of the Camp Borden Military Hospital, which contributed towards a much needed drinking fountain.

The Society has ended the year with a substantial balance with which two \$100 War Saving Bonds are to be purchased in the name of the Medical Society, University of Toronto.

#### MEDICAL ATHLETIC ASSOCIATION

<i>Honorary President</i> .....	Professor Roscoe Graham
<i>President</i> .....	M. P. Townsend
<i>Vice-President</i> .....	D. R. Clark
<i>Secretary-Treasurer</i> .....	M. F. Clarkson

Athletics in the Medical Faculty this year hit a new low for two reasons. The first was a noticeable relapse in enthusiasm for competition due to the withdrawal of Intercollegiate Competition. The second was the great amount of time taken by Military Training. All through the year the Athletic Association was constantly worried for fear no players would turn out to a scheduled game



because of Military Training. Our fear of this was not unfounded, for in looking over the accounts it is seen that more money was spent this year paying default fees than in any other year.

The Association was able to keep within the budget this year, besides paying off a debt incurred by last year's executive. Above this it will also give a substantial sum to one of the Army Athletic funds for the soldiers overseas.

The James Kinnear Memorial Trophy for squash was won by Paul Moses this year.

As a suggestion for the coming years, the present executive feels that unless better arrangements can be made with the C.O.T.C. for sports, the Athletic Association should enter only one team in each class of each sport, as it was in sports like volley ball, baseball, etc., where we had three or four teams that most of the trouble arose.

#### MEDICAL WOMEN'S UNDERGRADUATE ASSOCIATION

<i>Honorary President</i> .....	Dr. Marjorie McIntyre
<i>President</i> .....	Alice Whiteside
<i>Vice-President</i> .....	Frances Irvine
<i>Treasurer</i> .....	Agnes Eagles
<i>Secretary</i> .....	Janey McLeod

The M.W.U.A. enjoyed a number of meetings during the year 1940-1. The members knitted and also collected tinfoil for the Red Cross during the session.

At the November meeting, Dr. Jessie Gray gave the members an interesting account of her experiences in England in the past year.

Members again brought toys and canned goods to the annual Christmas Party which were later taken to the University Settlement for distribution in their Christmas baskets.

The "Nabob" Tea originally planned for March 1 was postponed owing to the death of Sir Frederick Banting. At a later date the students were at home to members of the Faculty and women doctors of Toronto, at Newman Club.

The annual chapel service at Knox College in honour of the graduating class of women was arranged by the M.W.U.A., the Medical Alumnae, and the Medical Women's S.C.M. The principal address made by Dr. Gwen E. Mulock was most inspiring.

#### MEDICAL WOMEN'S ATHLETIC ASSOCIATION

<i>President</i> .....	Shirley Fleming
<i>Vice-President</i> .....	Margaret McFarlane
<i>Secretary-Treasurer</i> .....	Helen Grady

This year the medical women had basketball, hockey, and tennis teams; badminton and ping-pong were also played. A great deal of credit is due the managers of these teams.

Although our standing was not high in inter-faculty tournaments, enthusiasm was constantly maintained.

Medical "M"s were presented to the following members of the graduating class: Miss Lilly Sugarman, Miss Jean Meiners, and Miss Laurie Patton.



